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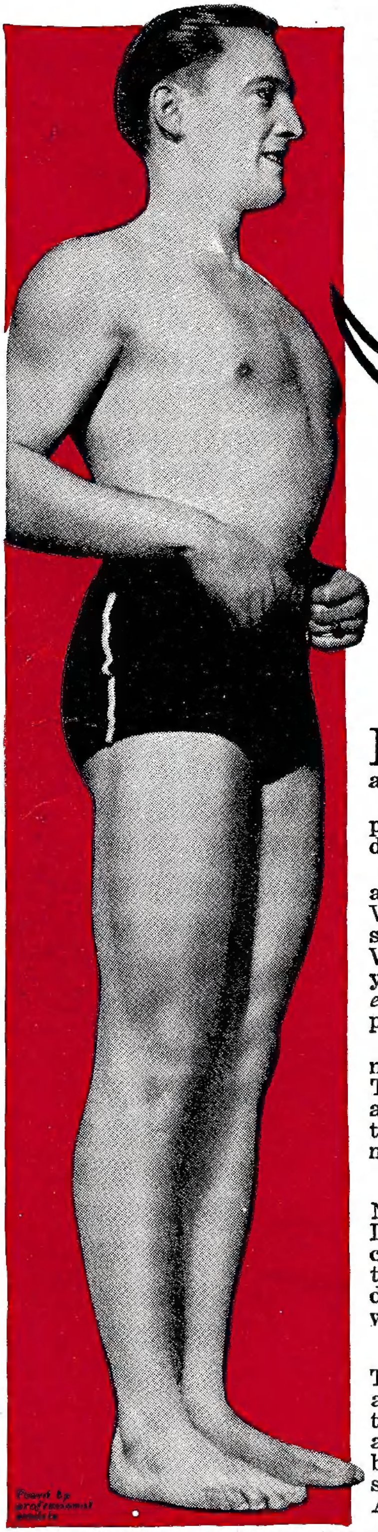

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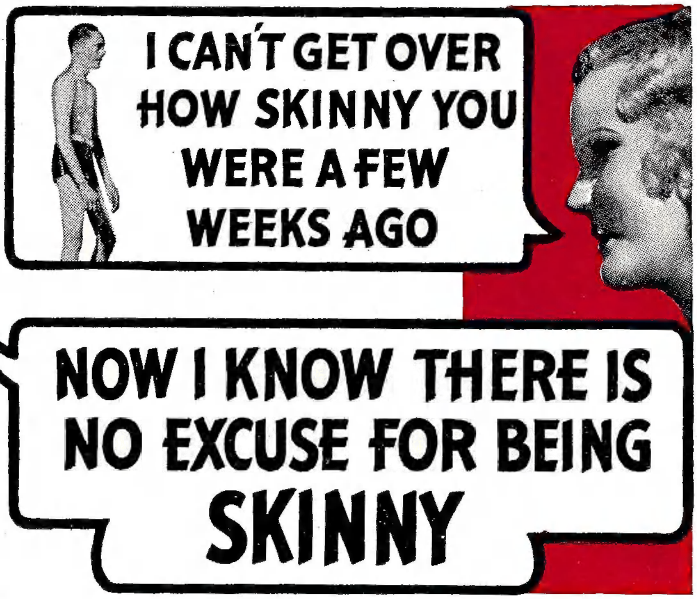
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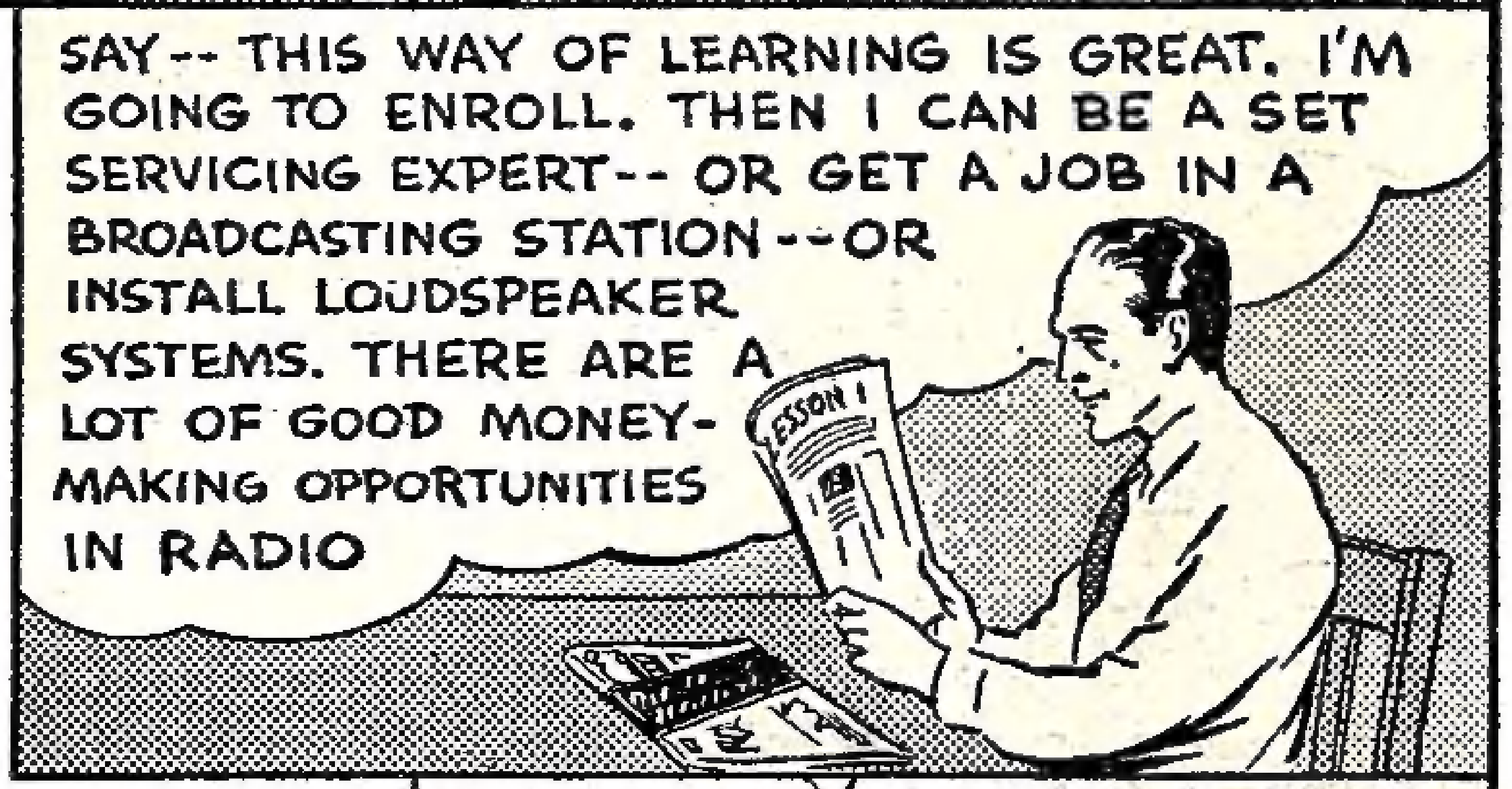
MARY'S RIGHT -- I'M NOT GETTING ANYWHERE. I OUGHT TO TRY A NEW FIELD TO MAKE MORE MONEY
LOOK AT THIS - RADIO IS CERTAINLY GROWING FAST -- AND THE NATIONAL RADIO INSTITUTE SAYS THEY TRAIN MEN FOR RADIO RIGHT AT HOME IN SPARE TIME
I DON'T THINK I COULD LEARN RADIO THAT WAY -- BUT THEY'LL SEND ME A SAMPLE LESSON FREE. GUESS I'LL MAIL THE COUPON AND LOOK INTO THIS

Yes, I will send my First Lesson FREE to show how easy it is to TRAIN AT HOME FOR A GOOD RADIO JOB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MAY,
1936

Volume XVI
Number 1

CONTENTS

SPECIAL FEATURES

H. G. Wells Photographs the Future in "Things To Come" - - - - 35
By Donald G. Cooley

Feeding America's Appetite for Games - 40
By W. A. Swanberg

He Made Sky Mapping a Big Business - 44
(The Story of Sherman M. Fairchild and His Aerial Camera)
By Richard H. Parke

$1000.00 Cash Contest—Do You Know Cars? - - - - - - - - 48

Docking the Normandie With the New York Tugboat Fleet - - - - 52
By James Dyson

When Hollywood Stars Turn to Hobbies 56
By Howard Sharpe

Outshooting the Guns of Gangland - 60
By Sterling Gleason

Floods—Winter's Devastating Aftermath 64
By Ivan Houk

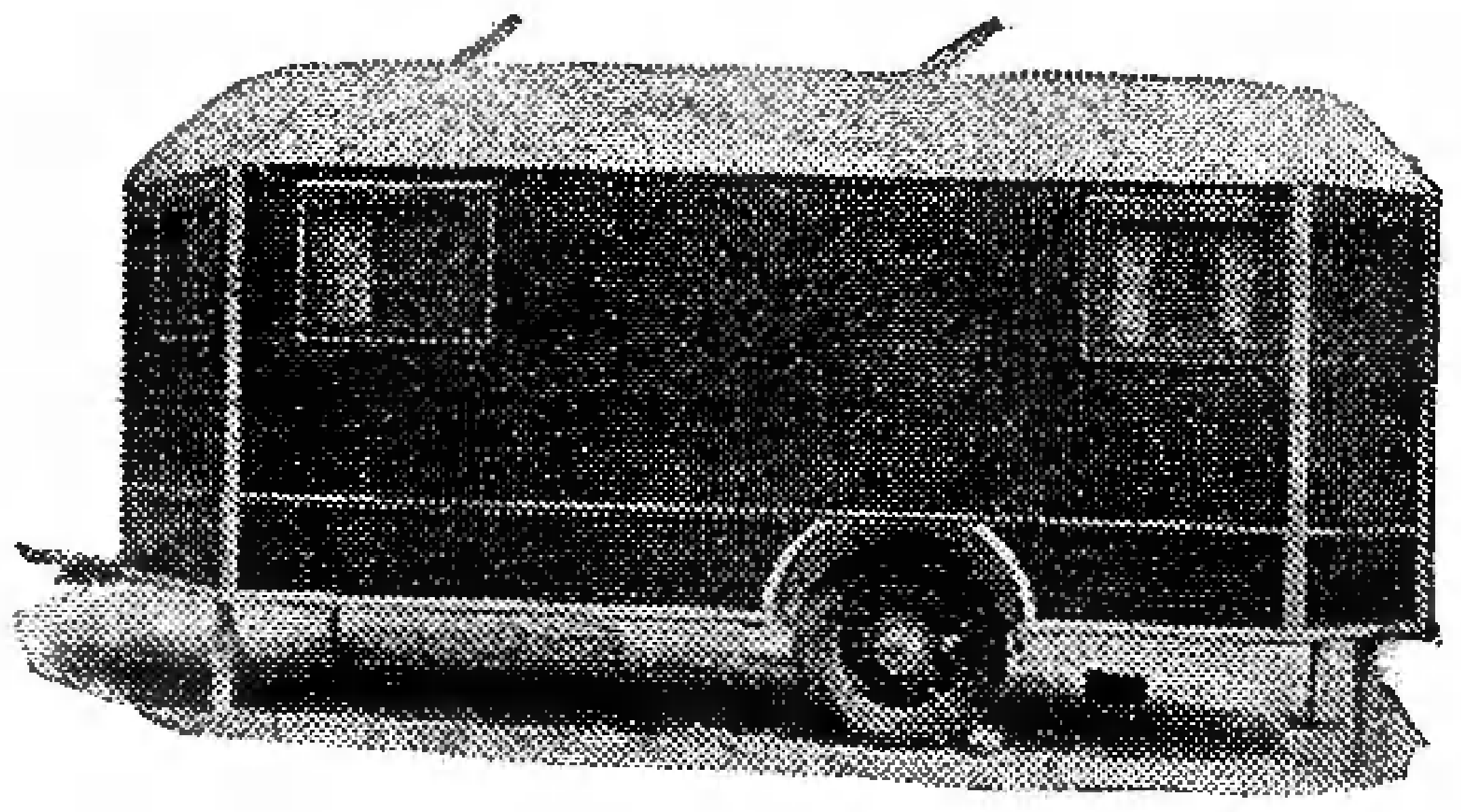
Amateurs Capture Action for the Newsreels - - - - - - - 68
By Maxwell R. Grant

Fly Rod Fishing for Small Mouth Bass 74
By Robert Page Lincoln

Linoleum—Another Industrial "Accident" - - - - - - - 82

Packing Thrills in a Motorcycle T. T. Track - - - - - - - - 86
By Walter E. Burton

Next Month—A Camp Trailer You Can Build At Home



You won't be able to resist building "Cruisemite," the latest addition to MM's trailer family. She is so compact and well balanced that she seems part of the car that is drawing her, while her interior is roomy and packed with conveniences. So simple are her plans that anyone can build her. Don't miss her in the June MM. ALSO IN JUNE — SPECIAL FEATURES AND KINKS FOR THE HOME OWNER AND HOME BUILDERS.

SHORTER FEATURES

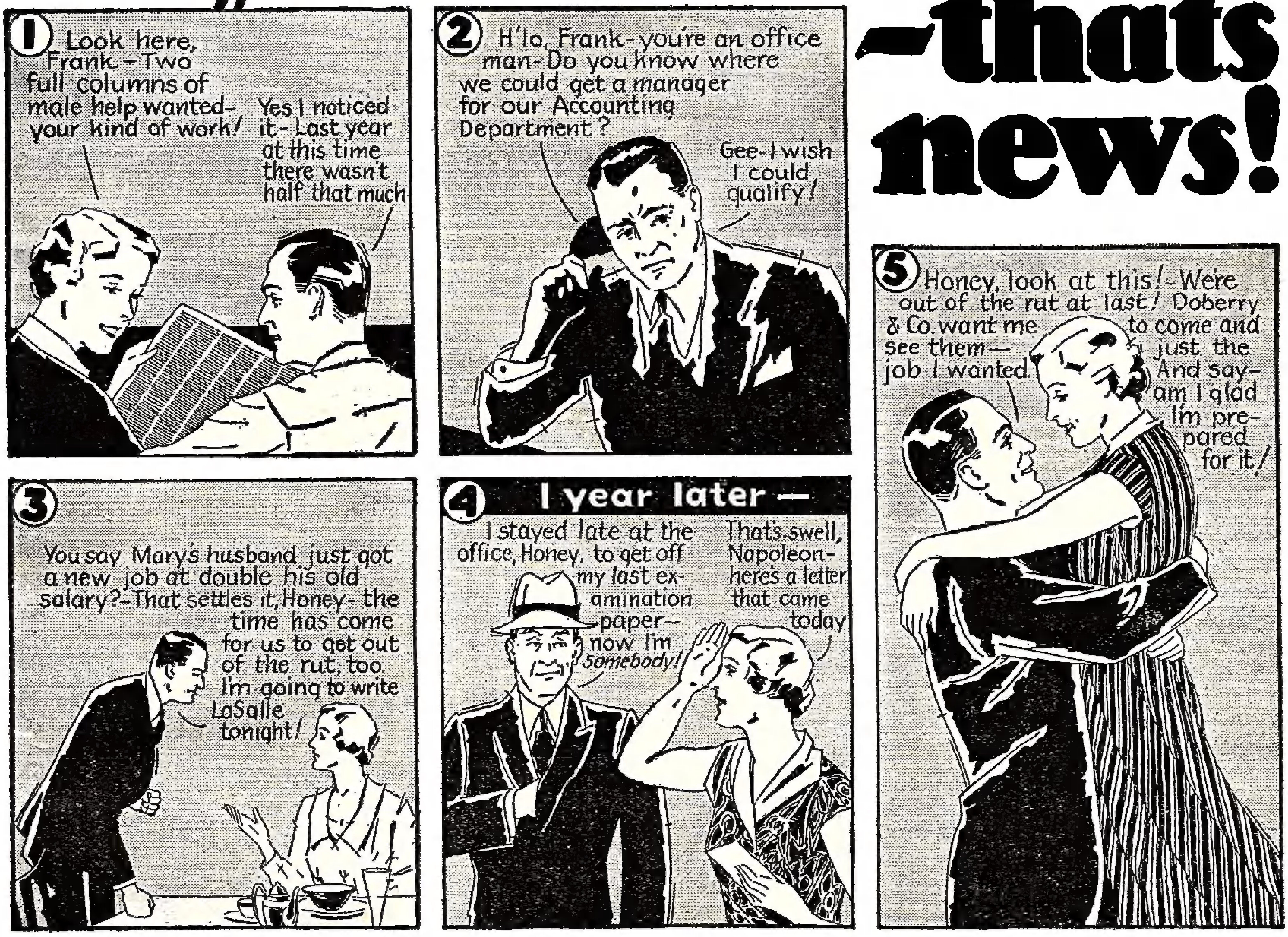
You Can Shout 15 Miles in Arctic - - - - - - - - 34
New York's Vertical Highways Total 1700 Miles - - 43
Meet Toonerville's Inventor—Fontaine Fox - - - - - 51
All-Electric Home Sets New Living Standard - - - - 70
Super-Speed Turbo-Plane to Span Ocean - - - - - 73
What New Inventions are Needed? $50 in Cash Prizes 77
Glass Fabrics Startle Experts 78
Home Scientists Banish Wash Day Blues - - - - - - 80

HOW-TO-BUILD FEATURES

A Studio Type Microphone for the Amateur - - - - 90
Plans for *Little Bear*—A Moth Class Racer - - - - - 94
Kitchen Utensils Make Professional Photo Enlarger 99
"Chinook" A Midget Gas Engine for Your Model - - 100
By Weston Farmer

[*Continued on page 6*]

When jobs are looking for men —thats news!


1
Look here, Frank—Two full columns of male help wanted—your kind of work!
Yes I noticed it—Last year at this time there wasn't half that much
2
H'lo, Frank—you're an office man—Do you know where we could get a manager for our Accounting Department?
Gee—I wish I could qualify!
3
You say Mary's husband just got a new job at double his old salary?—That settles it, Honey—the time has come for us to get out of the rut, too. I'm going to write LaSalle tonight!
4
I year later—
I stayed late at the office, Honey, to get off my last examination paper—now I'm Somebody!
That's swell, Napoleon—here's a letter that came today
5
Honey, look at this!—We're out of the rut at last! Doberry & Co. want me to come and see them—just the job I wanted. And say—am I glad I'm prepared for it!

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CONTENTS—Continued from page 4

Power Saws Built from Scrap Parts - - - 105
Captive Model Planes Become Flying Kites - 106
By Dick Cole
Old Phonographs Make Useful Furniture - - 109
Make These Novelties With Rainbow-Hued Plastics - - - - - - - - - - - - - 110
By Dale R. Van Horn

NEW MECHANICAL INVENTIONS

Giants of Sea and Air Vie for Honors - - - 39
New Plane Rises Like Autogyro - - - - 42
Electric Eye Tests Auto Lights - - - - - 42
Locomotive Dons Streamline Dress - - - 42
Wind-Tunnel Auto Foreshadows New Airship 47
Vacuum Cleaner is Shop Tool - - - - - 47
New Respirator Aids Miner's Safety - - - 47
Street Cars to Follow Bus Design - - - - 47
Music Students Aided by Gadgets - - - - 50
Elevator Grades 1700 Eggs an Hour - - - 50
Automobile Exhaust Helps Fight Fire - - - 54
Ancient Cotton Spinner Run Again - - - 54
Mechanical Tornado Powers Barrel Plane - 55
Diesels Speed Travel in Argentina - - - - 55
Rolling Tripod Aids Movie Making - - - - 55
Youth Builds Powerful Telescope - - - - 58
Shop Travels to Scene of Work - - - - - 58
Mail Carried by Rocket Plane - - - - - 59
New Glass Bends Like Celluloid - - - - 59
Senate Subway is Safest in U. S. - - - - 59
Exhaust Heats Airplane Wings - - - - - 62
Baby Carriage Has Stair Climber - - - - 62
Formula Found for Synthetic Ice - - - - 63
Excavator Moves 900 Tons Per Hour - - - 67
Portable Gin Mounts on Truck - - - - - 67
Piano Folds into Buffet Cabinet - - - - 67
Models Tested in Wind Tunnels - - - - 71
Radium Made in Million-Volt Tube - - - 72
Robot Bookkeeper Actually Thinks - - - 72
Tiny Engines Propel Model Planes - - - - 72
French Mail Plane Crosses Atlantic - - - 76
Cocoanut Novelties Prove Profitable - - 76
Machine Separates Atomic Twins - - 79
Small Air-Conditioner Saves Fuel - - - 79
Thin Vanes Form Non-Skid Tread - - - 79
Device Fits Gloves Scientifically - - - - 81
Road Magnets Cut Flat Tire Toll - - - - 84
Small Airliner is Fastest in Service - - - 85
New Safety Glass Bends on Impact - - - 88

[*Continued on page 8*]

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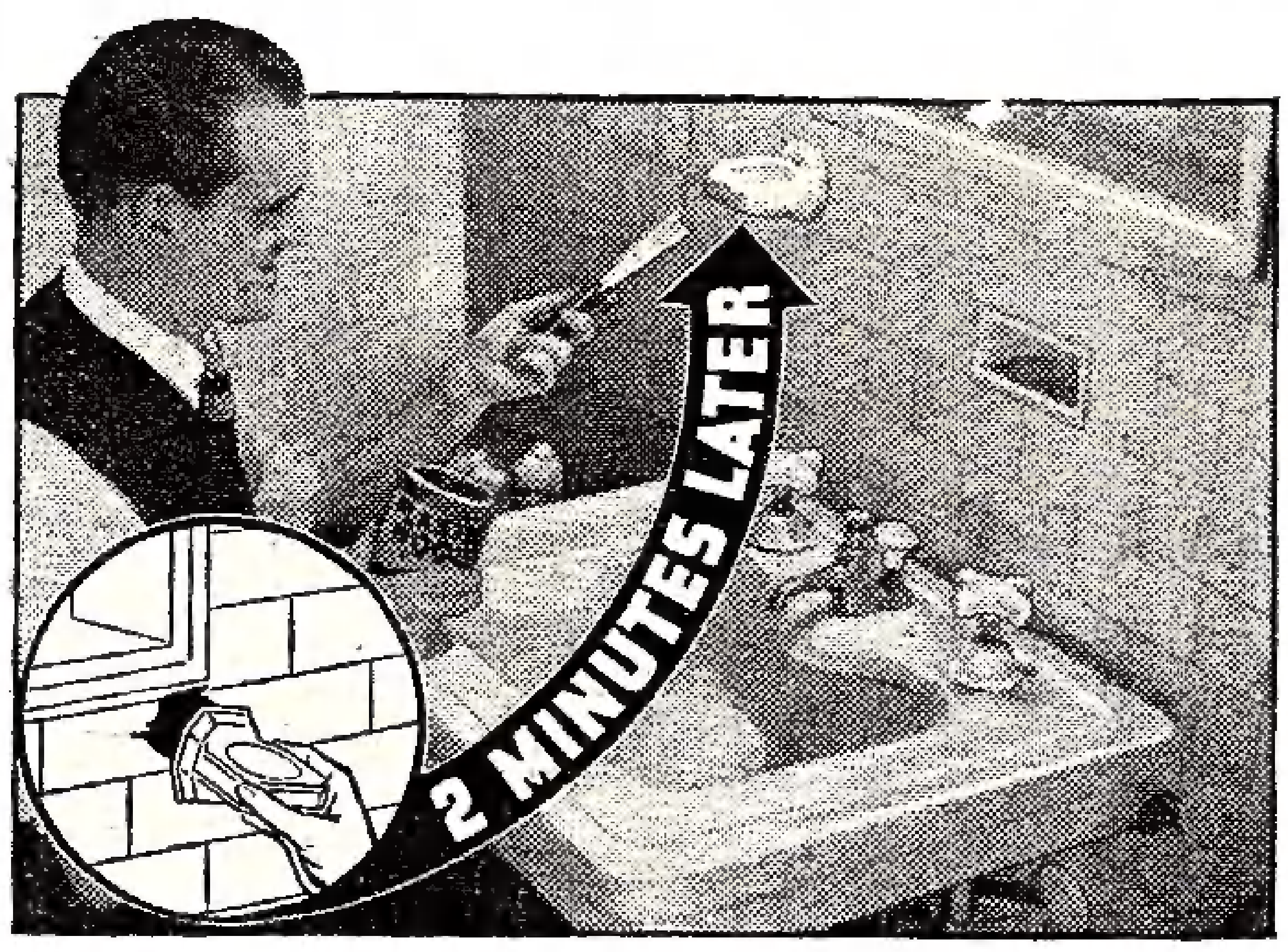

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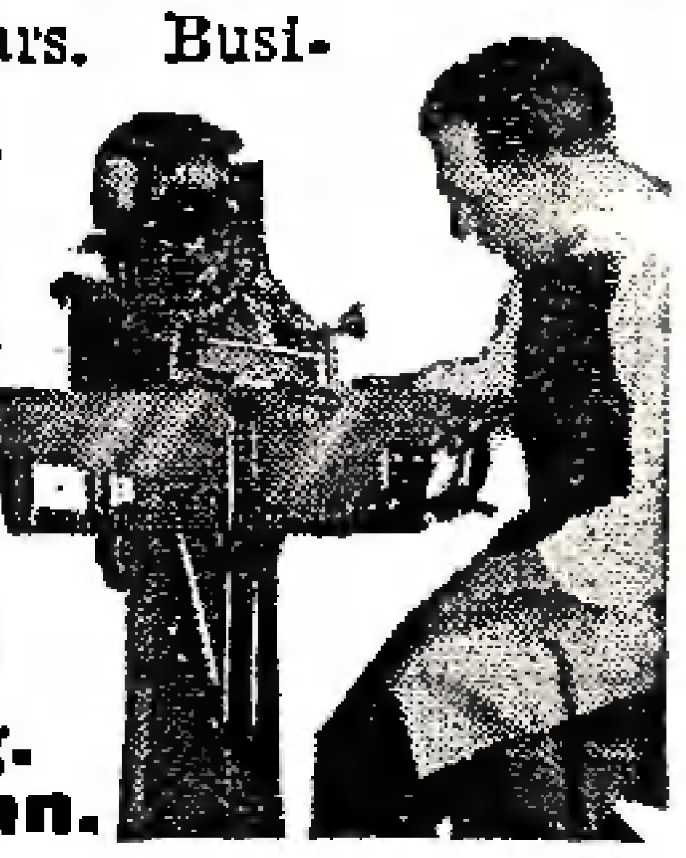

CONTENTS—Continued from page 6

INTERESTING SCIENTIFIC ITEMS

Flame in London Opens U. S. Museum - - 39
Barney Oldfield Gets Odd License - - - - 50
Auto Driven to Western-Most U. S. - - - 54
Movie Gliders Break Flying Records - - - 58
Rubber Used to Furnish Entire Room - - - 62
Sun's Heat Surpassed by Electric Arc - - - 63
Show First Diesel at Museum - - - - - 63
Plants Grown Without Earth in Jar - - - 71
Next Four Years to be Wet and Colder - - 76
President Has "Official Forger" - - - - - 76
Texas Centennial Shown in Miniature - - 81
Dust Powder Builds Up 450,000 Volts - - - 84
Mirror Checks Faults of Oarsmen - - - - 84
Pontoon-Glider Stunted by Youth - - - 85
Carrier Pigeons Turn Cameramen - - - 85
Camera Brings Surveyor's Field Indoors - - 88

FOR THE WORKSHOP FAN

Kinks Suggested by MM Radio Experimenters 91
Practical Ideas for Shop Use - - - - - 92
Reading Your Home Meters for Profit - - - 93
Preparing the Home for Spring - - - - 98
Inlay Projects with Sawdust Paste - - - - 108
A Clothes Rack for Junior's Room - - - - 108
Electric Magic Box Stumps Magicians - - 112
Celluloid Improves Carbon Copies - - - - 112
Practical Ideas for Everyday Use - - - - 113
Electric Hammer Designs Metal - - - - 114
Dancing Ducks are Easily Made - - - - 114

DEPARTMENTS

Solving the Readers Problems - - - - - 14
Random Chips from the Editor's Workbench 20
Nic Sprank - - - - - - - - - - - 34
Paragraph Oddities - - - - - - - - 66
Sportsman's Campfire - - - - - - - 74
Radio Sparks - - - - - - - - - - - 89
Business Ideas - - - - - - - - - - 146

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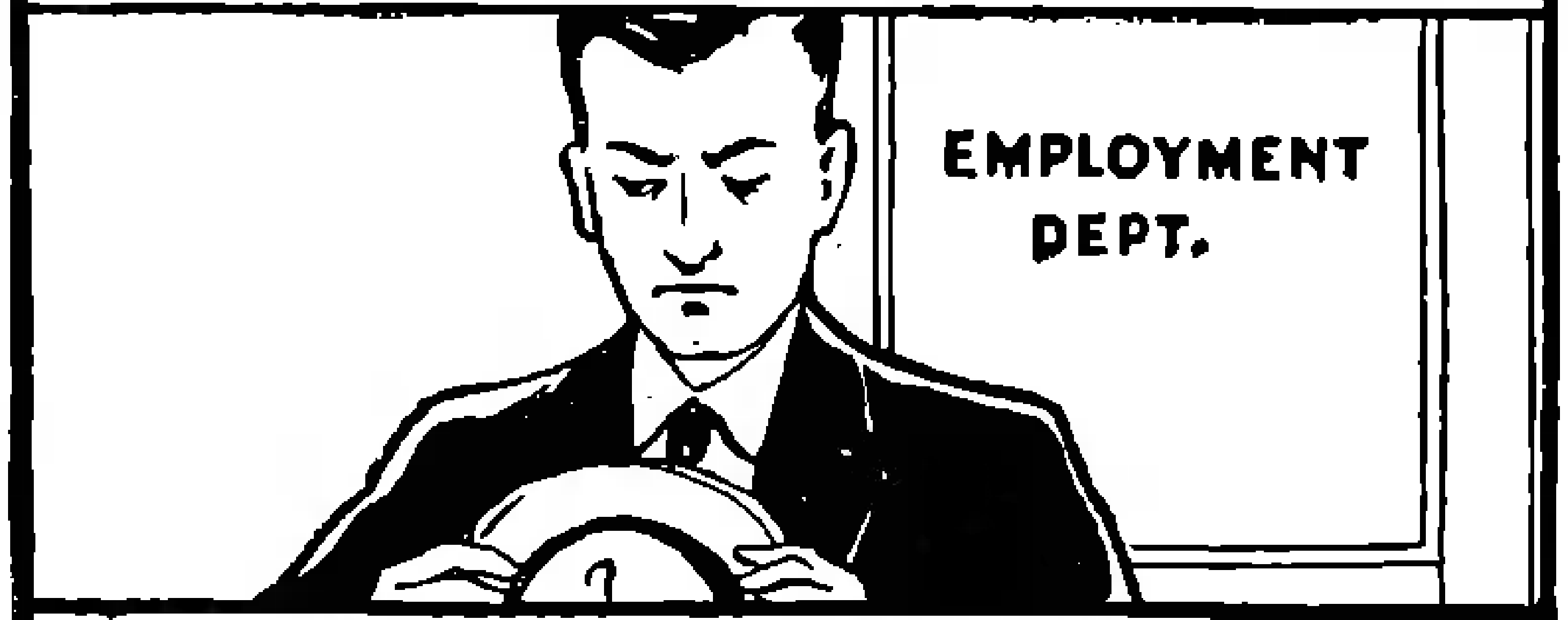

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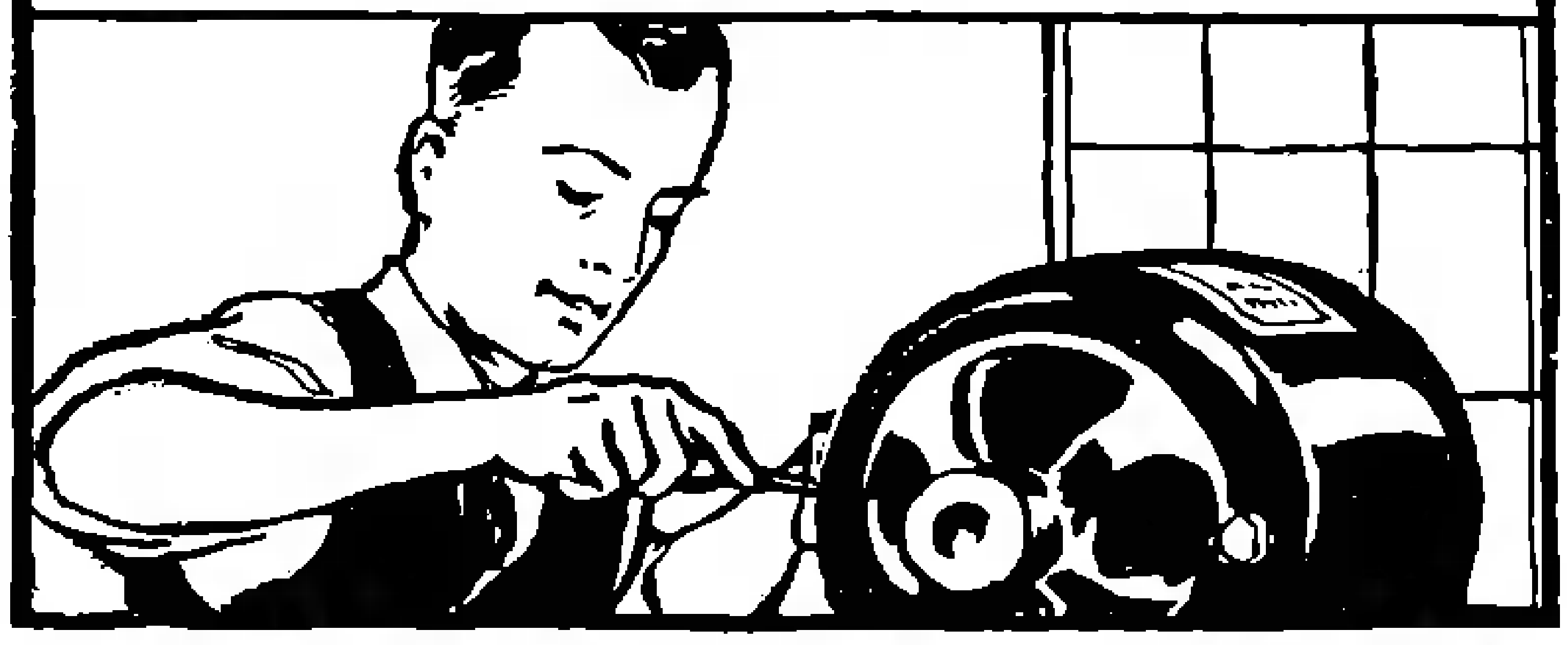

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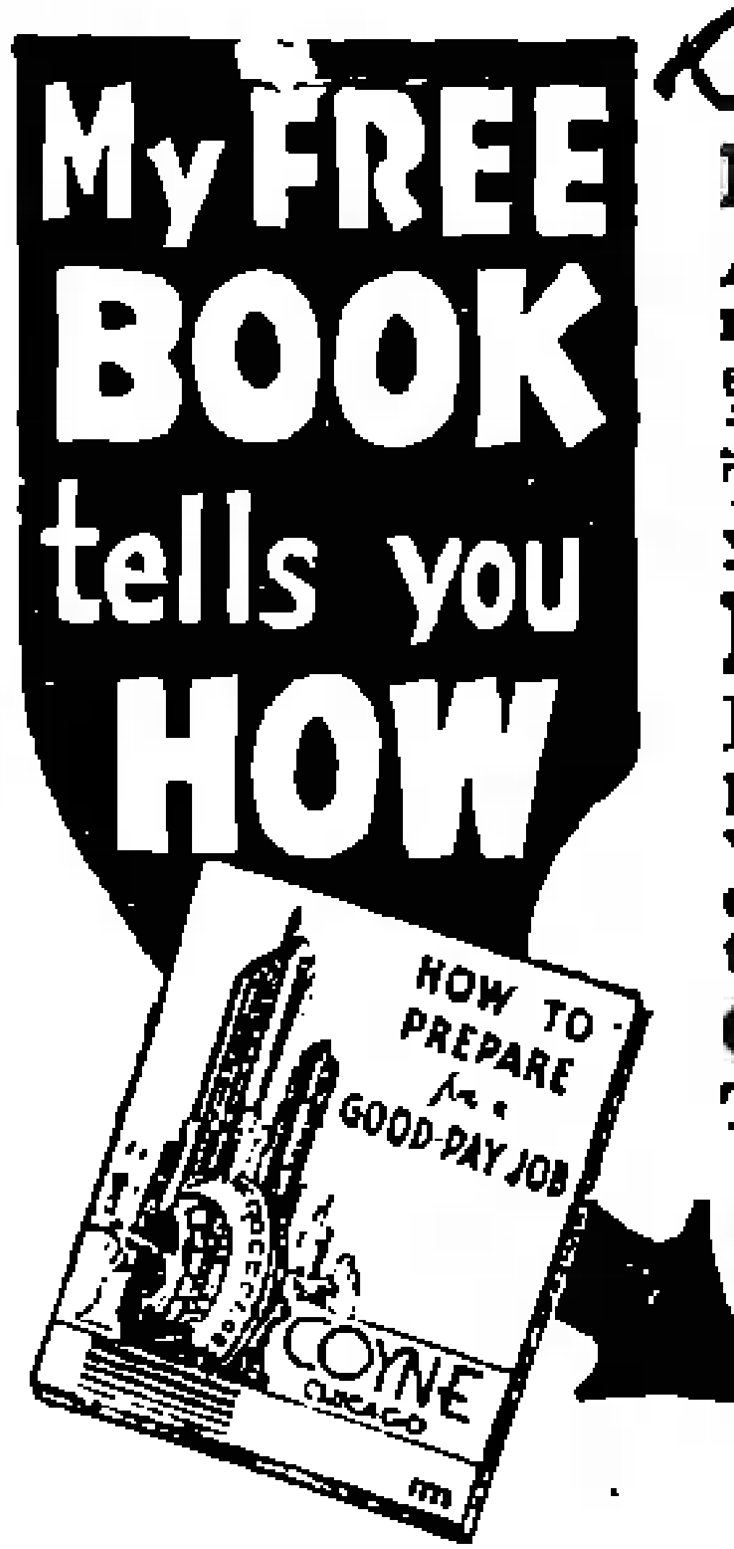

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INVENTORS

TO BE successful as an inventor, you don't need to be an Edison who took out 1099 Patents before he died, or a C. F. Kettering, who helped develop the Self-Starter, Duco, Ethyl Gas, and other outstanding inventions, and is today the famous head of the Research Division of the General Motors Corporation. In fact, you don't need to be known as an inventor at all, if you have a practical, useful, salable invention—or an idea for one—**and go about it right.**

Remember that for every Edison or Kettering, for every McCormick, DeForest or Atwater Kent—there have been thousands of unknown men whose inventions helped along the wheels of progress and helped the inventors financially at the same time.

Many Little Ideas Have Big Commercial Possibilities

For example, who knows the name of the inventor of the wooden golf tee, the ordinary crinkly hair pin, or the metal ball or disc that the average housewife uses for scouring pots and pans? Who knows the inventors of the thousands of gadgets that you will find in the ten-cent stores, in the modern drug and department stores? Some day, stop and look at some of the simple articles you'll find on the counters of a ten-cent store. Notice how many of them are marked Patented or Patent Applied For. It is an interesting, educational experiment. These inventors, most of them, weren't of the genius class. They simply got an idea for doing something in a better, easier, faster, or more economical way—AND THEN DID SOMETHING ABOUT IT.

Interesting Points

Who is today's "champion inventor"?

Ans.: John F. O'Connor, of Chicago, Ill., holds 949 Patents, more than any other living man.

Who is "Lady Edison"?

Ans.: Miss Beulah Louise Henry of New York City leads all women inventors, holds fifty patents; is known as "Lady Edison".

What is an improvement?

Ans.: Nearly all inventions today are improvements over earlier inventions. Often the improvement proves more profitable than the earlier invention.

Is a model necessary?

Ans.: Today, most inventions are patented without models. A subject fully explained in our book.

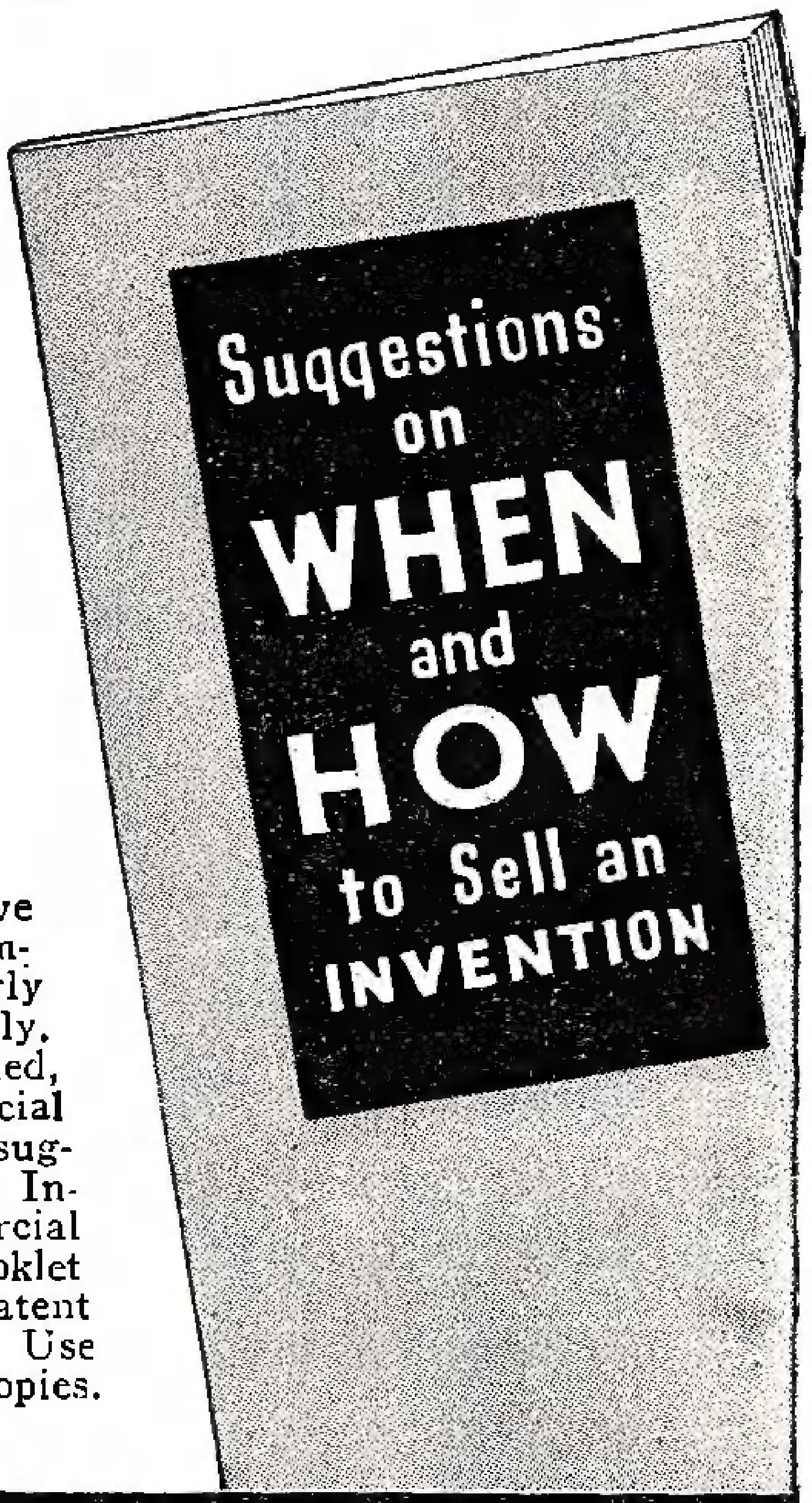
What is the preliminary search?

Ans.: The preliminary search is ordinarily the first step to help an inventor. Also fully explained in our book. Send for a copy today.

A New Book About Selling Inventions

There are two sides to every inventive success: The inventive side and the commercial side. A good invention poorly handled, can prove a failure commercially. An ordinary invention, properly handled, can be made a money-maker. In the special booklet, shown here, we give you some suggestions on "When and How to Sell an Invention"; practical hints on the commercial side of inventing. We'll send this new booklet along with the big 48-page book, "Patent Protection" illustrated on the next page. Use the convenient coupon to request your copies.

You may be able to do as well as others who have been successful. That only time can tell. But there is one thing you can do, **and do now,** without waiting on time. You can find out easily and quickly **exactly what to do to protect yourself.** In the 48-page book, "Patent Protection" shown on the opposite page, which will be sent to you FREE, we tell you what many other inventors have done, just what you yourself must do to make Application for a Patent, give you interesting facts about inventive history, show you 115 mechanical movements that inventors have used in working out ideas, and **much more.** Decide now to get a copy of this interesting book. Its facts can be worth much—**yet they cost you nothing.**

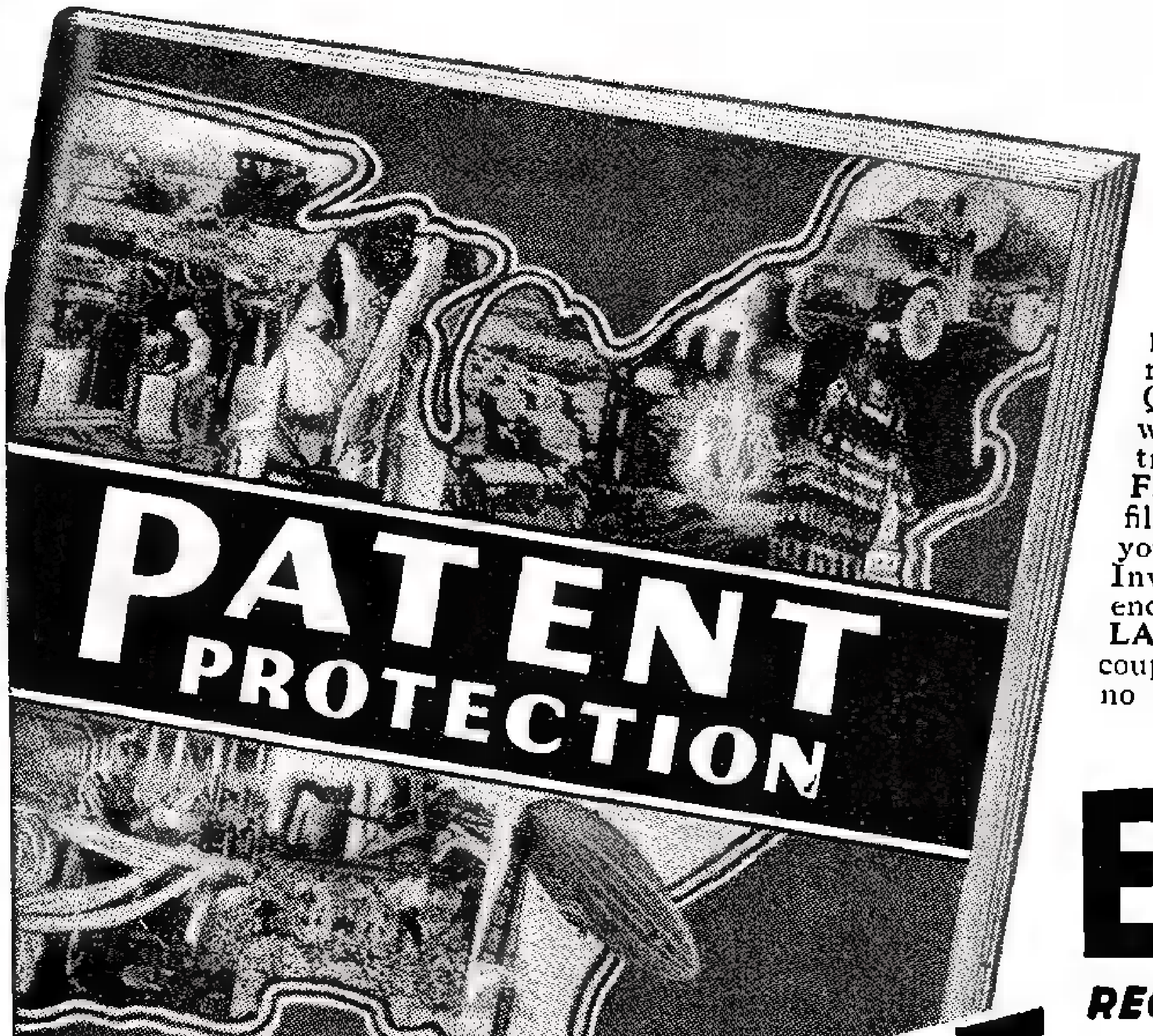


Suqqestions on WHEN and HOW to Sell an INVENTION

We Cordially Invite You to . .

NOTE★ You may not be an Edison or a Kettering ★ but still you may have a good idea

YOUR QUESTIONS ANSWERED! There are a lot of questions that the average man with an invention, or an idea for one, wants answered before he goes ahead. Here are a few of them that most inventors put up to us: How do the Patent Laws protect me? What easy steps can I take, without cost, to put myself in position to support my belief that I am the **first** man to think of my **invention**? Is a Patent worth the cost? Should I try to sell my invention before I have it Patented? Is there any safe, business-like way to secure financial help? If I do apply for a Patent how shall I reach people who can market my invention? Can I protect and sell an improvement on some invention that has already been Patented? These are but a few of the questions which usually confront the average man. **You need the answers! YOU CAN HAVE THEM, without cost, trouble, or delay.**



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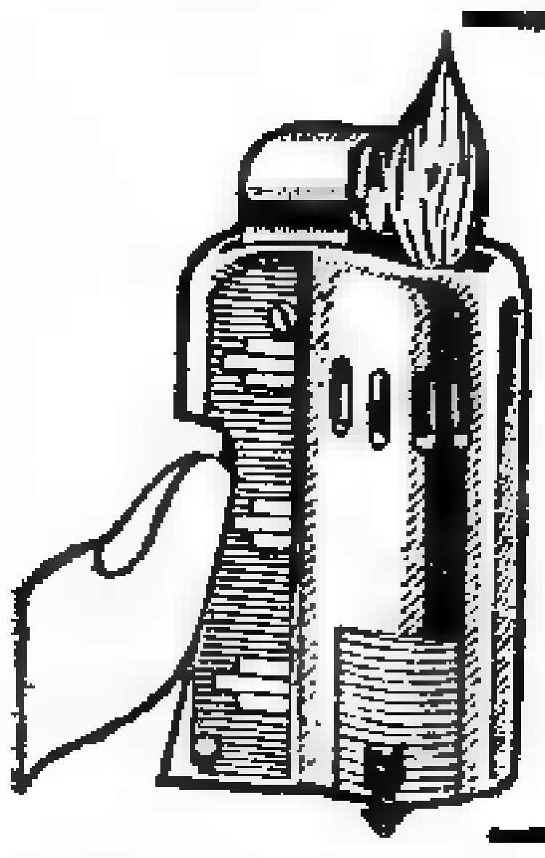

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Polished Nickel. Retails $1.50. Sells to the agent at $9 a dozen. Sample 75c. Sample Chromium Plated $1.00.

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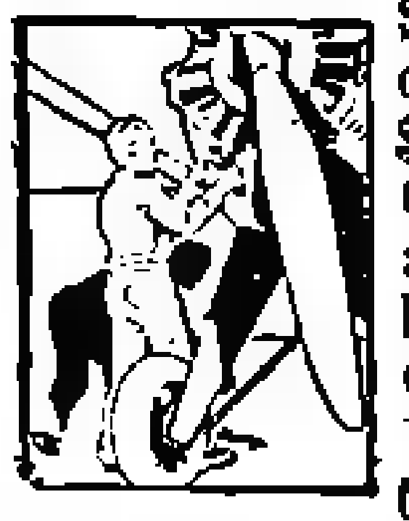

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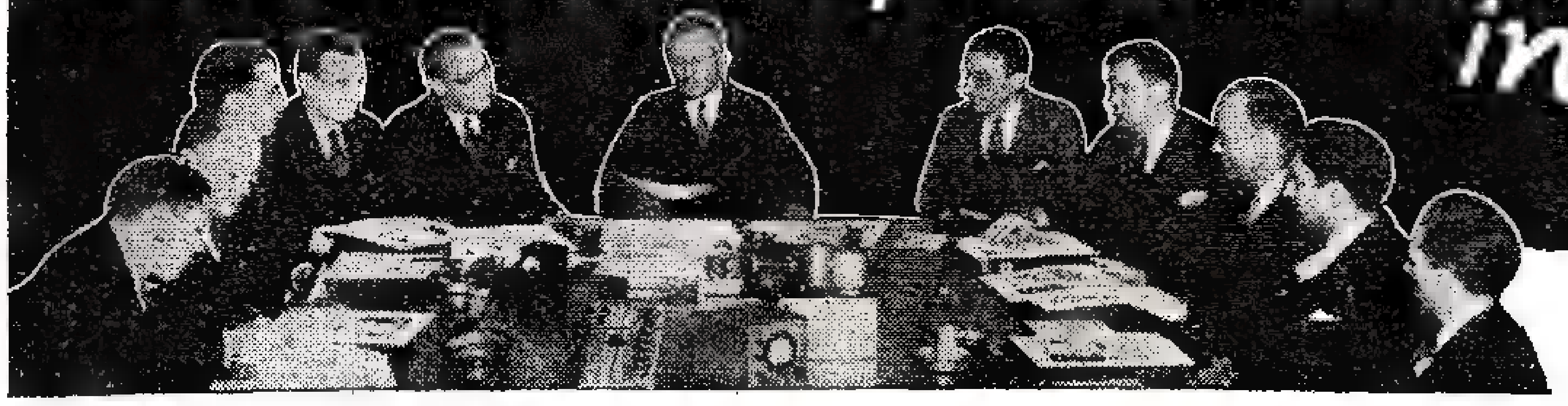

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"Made my first spare time money after finishing four lessons. Over $500 spare time money in 10 months. R-T-I is O. K."

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* * *

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* * *

"Before finishing my training I was made Manager of a Department Store's radio section."

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* * *

"My job paid me $18 a week before taking your training. Shortly after starting was averaging $60 a week. Have made as high as $250 in single week."

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TRAINED MEN NEEDED IN ALL BRANCHES

If you're dissatisfied with small pay—lay-offs and an uncertain future—here's an opportunity that's too good to miss. At the cost of only the time it takes you to mail the coupon, you can get my big FREE book, "RADIO'S FUTURE AND YOURS." This book tells how you can *learn at home under the supervision of factory engineers, to make more money* almost at once in Radio—whether you want to make Radio your life's work, or use it to pick up an extra $5 to $20 a week in your spare time.

MORE OPPORTUNITIES THAN EVER BEFORE

Radio is still forging ahead. *1935 was its biggest year.* Over 5 million new sets sold. Over 30 million dollars paid for service alone in 1935. Where only a few hundred men were employed a short time ago, thousands are employed today. And where a hundred jobs paid up to $75 a week—there are thousands of such jobs today—many paying even more. And new jobs are being created all the time—*full time jobs and spare time jobs.* Get my book and see how easy it is to learn at home for this good-pay work.

"SHOP TRAINING" FOR THE HOME

R-T-I Training is different than any training you ever heard about. It comes to you right from the heart of the Radio Industry—right out of the factories where Radio sets and other vacuum-tube devices are made. It was planned and prepared and is supervised by big radio engineers IN these factories—by men appointed for the purpose. This means that trained the R-T-I way, you'll be trained as the Radio Industry wants you trained—just as the Radio Industry, itself, would train you if it was doing the job.

TELEVISION, PHOTO ELECTRIC CELLS, PUBLIC ADDRESS SYSTEMS INCLUDED

Radio service work is only the starting point in R-T-I Training. From there it will take you through the whole field of Radio and Electronics. You will learn about every new development, including Television so you'll be ready when Television breaks. You'll also learn the big money subjects such as Aviation and Auto Radio; Public Address Systems; how to handle Photo Cells; Sound Picture Recording, etc.

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Start almost at once doing part time radio work. I furnish 4 outfits of apparatus that you build into test equipment with which you can do actual jobs and earn extra money. My training pays its own way and you get your money back if not satisfied.

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You don't have to be a high school graduate, nor even have finished the grades. My Training is so simple, easy, and practical, that the average man, regardless of age, education or previous experience can master it. It offers the chance you have wanted to get out of a small-pay, no-future job, into good pay work with a future, in Radio and all its branches.

GET MY FREE BOOK

INVESTIGATE! Learn why R-T-I Training is different. Find out why R-T-I Trained men get "Quick Results" and "Big Results." Send for your copy of "Radio's Future and Yours" today. It tells you about Radio's amazing opportunities. It describes my approved training. It tells what R-T-I students are doing and making. It gives the names of my Advisory Board and 50 endorsing manufacturers. It's FREE. Clip, sign and mail coupon RIGHT NOW!

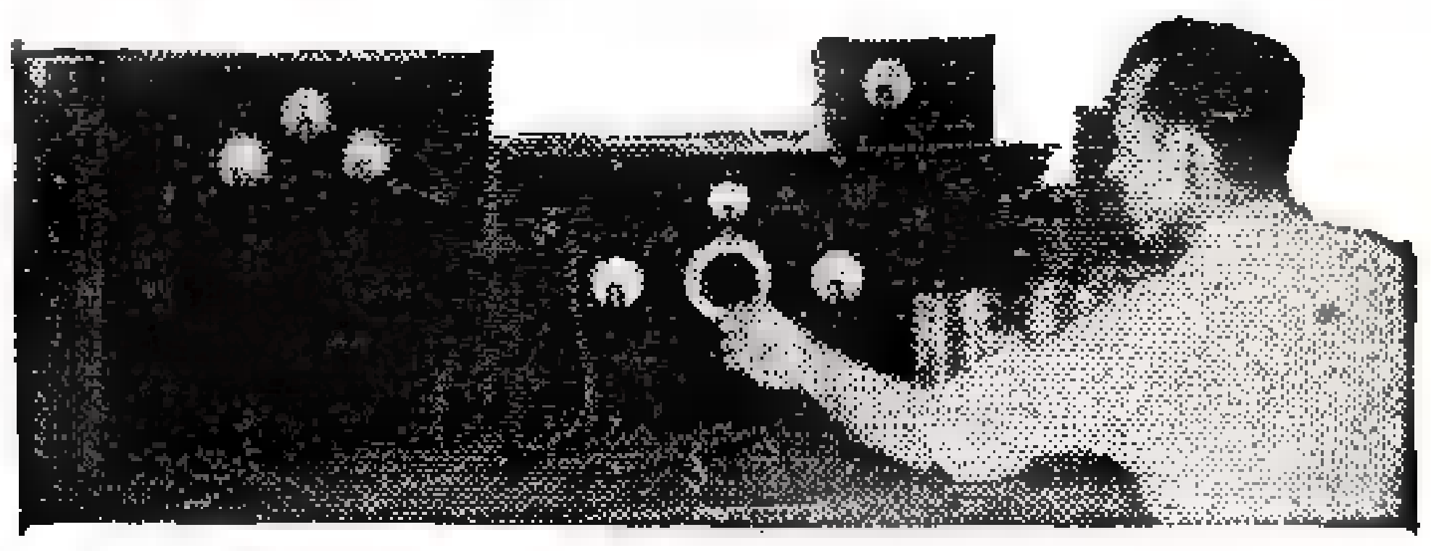
RAY D. SMITH, President

RADIO AND TELEVISION INSTITUTE

Dept. 35 **2150 Lawrence Ave.** **Chicago**

Big Money in Auto and Police Radio Work

W. H. Carr, 402 N. 16th St., Kansas City, Kansas, an R-T-I student, has charge of 35 radio equipped cars for the Kansas City Police and Fire Departments. His salary is $230.00 a month and he is furnished with an automobile, gas, oil, etc. He says, "If I had not taken your course I would not be able to hold this job."



Makes $600 in One Month

Herbert B. Thomson, Gorman, Texas, formerly an oil well driller, borrowed $170.00 to start a spare time radio business after completing 12 R-T-I lessons. He made money from the start. In two years his shop was worth $3500. He says, "Because of my R-T-I Training I made $450 in September and over $600 in October, 1935. It pays to be R-T-I Trained."

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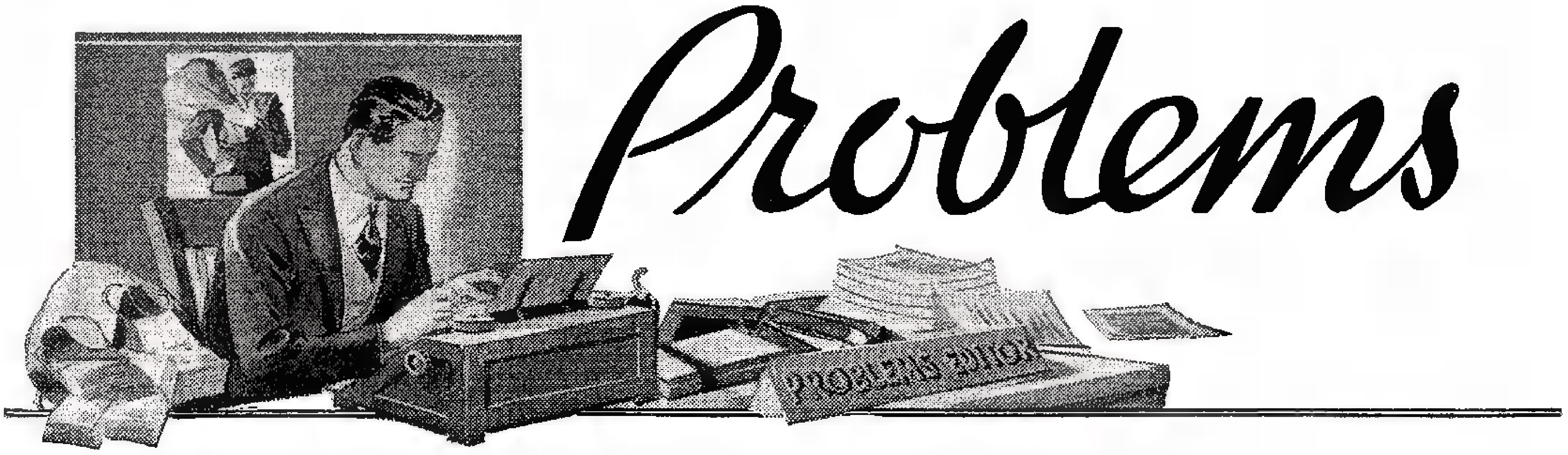


Your Questions Answered By M M's Editors

CHANNEL FRAME FOR TINY TOM

Can brass channel be substituted for the frame of *Tiny Tom* model locomotive? What is the best wheel thread dimension for 00 gauge? Where can I get drive wheels?—A. E. T., New York.

Brass channel, ⅝″ wide with ⅜″ sides, a standard size, can be substituted on MM's Atlantic type 4-4-2 locomotive. If channel is used, it can be bolted to the tank under the front end of the boiler and to the firebox with 2-56 machine screw. The rear screw can also hold the trailer truck.

An 00 gauge authority suggests that a wheel tread of 47/64″ would insure most satisfactory running conditions. Builders of Tiny Tom can get better play for 00 gauge by making the back to back flange dimensions of the drive wheels and the shouldered axles 43/64″ instead of the 11/16″ shown on the drawings. An advertiser of 00 gauge supplies in MM's classified columns can furnish the drive wheels for Tiny Tom.

AN EASY PULLING AUTO TRAILER

I am interested in an auto trailer that will have a minimum of wind resistance and one which will not prove too difficult to pull. Can you advise a trailer that will come near these requirements?—R. A., Lubbock, Texas.

We believe that our ALOHA trailer will best meet your demands since it is not only easy to pull, but partially streamlined as well. A trailer of this type can be constructed for about $200. Plans for this trailer can be obtained in blueprint form at $2.00 per set.

RECLAIMING KELP FROM THE SEA

In your March issue there appeared a very interesting article on kelp farming. While no mention was made of the kelp to be found in the Atlantic Ocean I am wondering if it is the same as that in the Pacific as I should like to use it for poultry feed. Living near the ocean I have access to large quantities of this sea plant.—F. M., Union Beach, N. J.

At present the nation's commercial supply of kelp comes from the Pacific Ocean since it is superior to that found in the Atlantic. From this plant comes a number of valuable drugs which are important to growth. So far sea weed in the Atlantic has not been put to commercial use as drugs or food.

ALTERING CONSTRUCTION OF "SCRAM"

I recently constructed your boat, SCRAM, and am well pleased with it. Using a converted automobile motor it planes with four people in the front seat. Now, as I wish to use this craft chiefly for fishing is it possible to move the engine ahead about 18 inches to provide more room?—W. J. W., Falconer, N. Y.

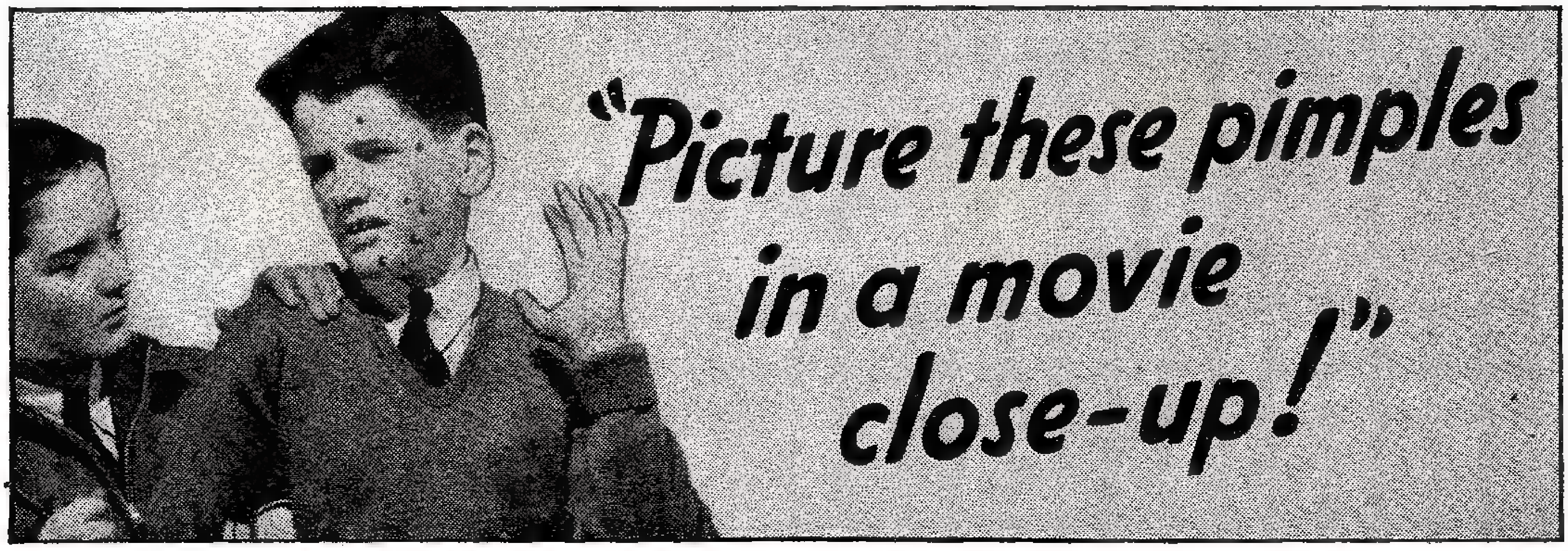
We strongly advise against any changes in MM boat designs. If this is done you lower the angle of the planing surface losing most of the lift. As MM boats are in most instances first constructed in miniature the designers are able to determine the best location of the motor and arrangement of other details so as to insure best results. When the model's engine was moved ahead the boat steered badly and was also light by stern.

MAKING VESTPOCKET RECEIVER COILS

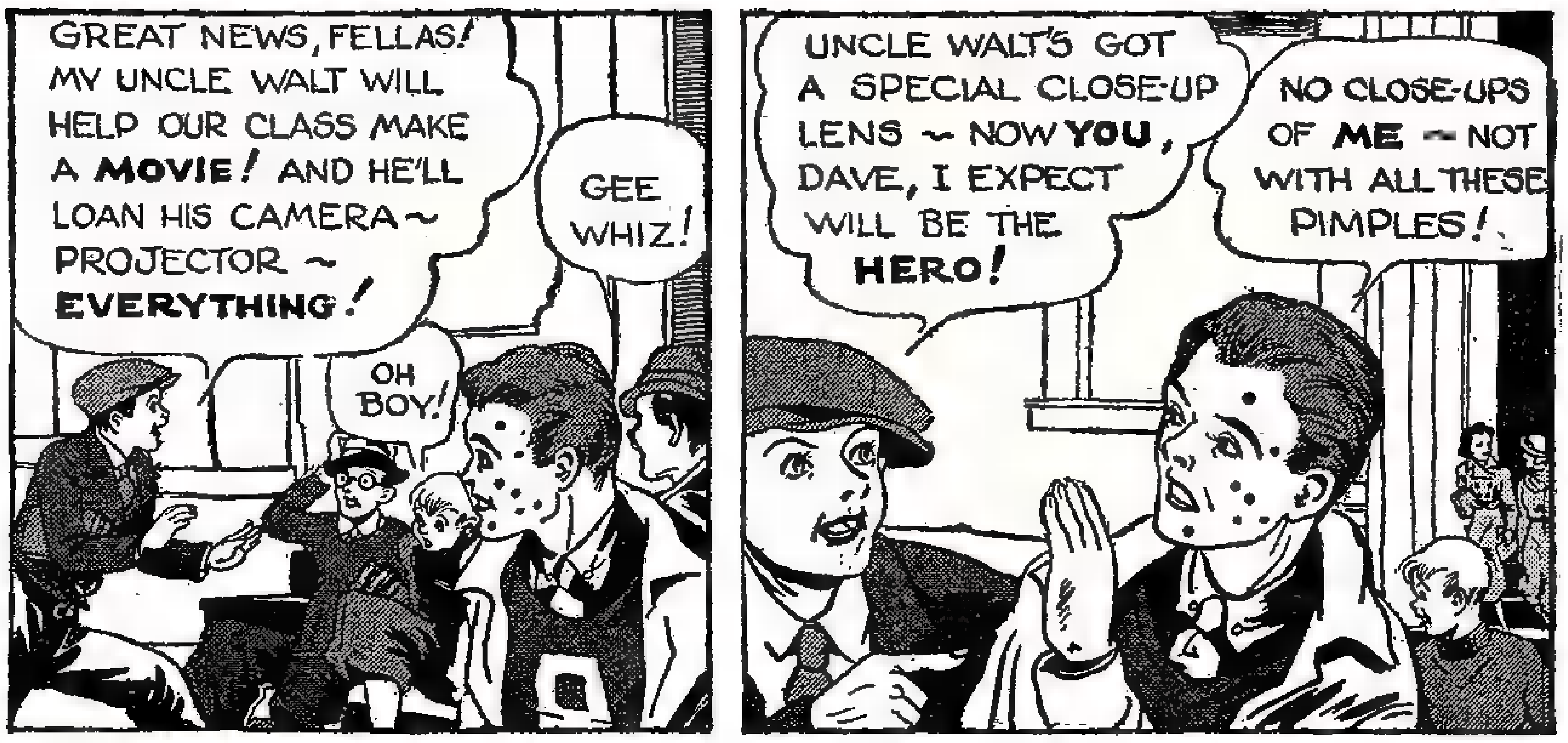
What is the correct wire to use in winding the Vestpocket receiver's coils as described in February, 1936 MM.—L. A., Reno, Nev.

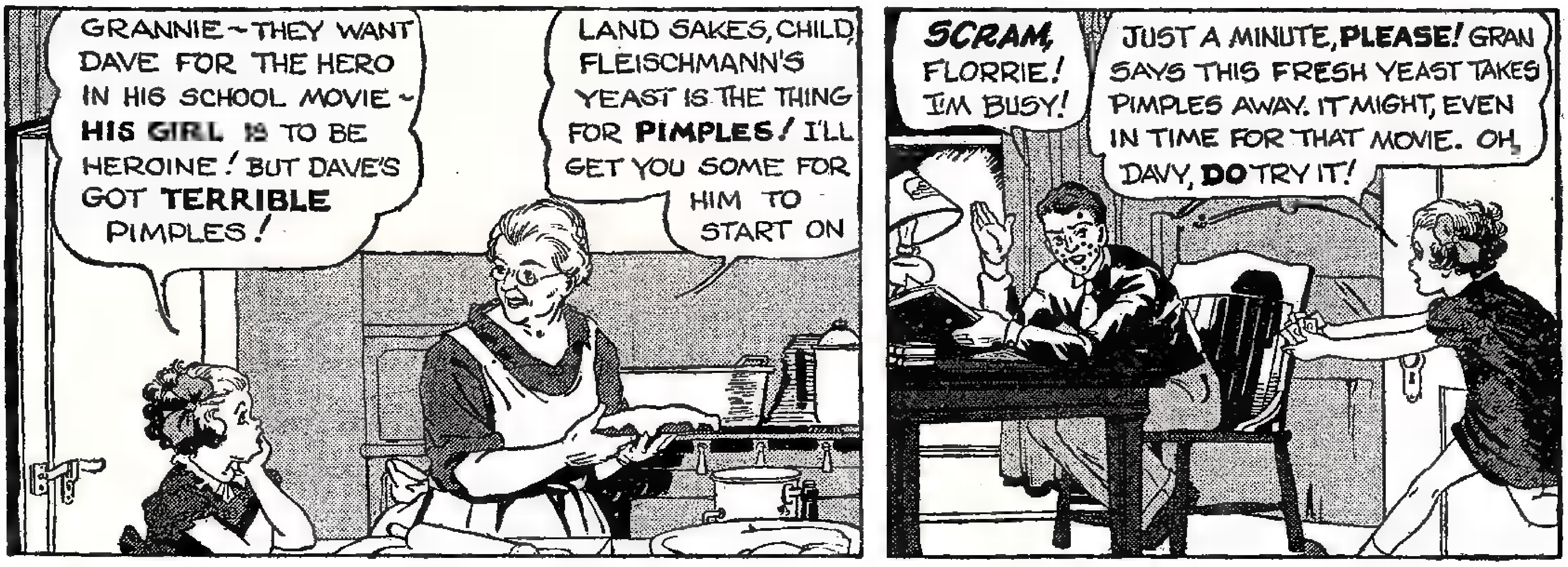
Wind plate and grid coils with No. 30 enameled. Antenna with No. 20 D. C. C.

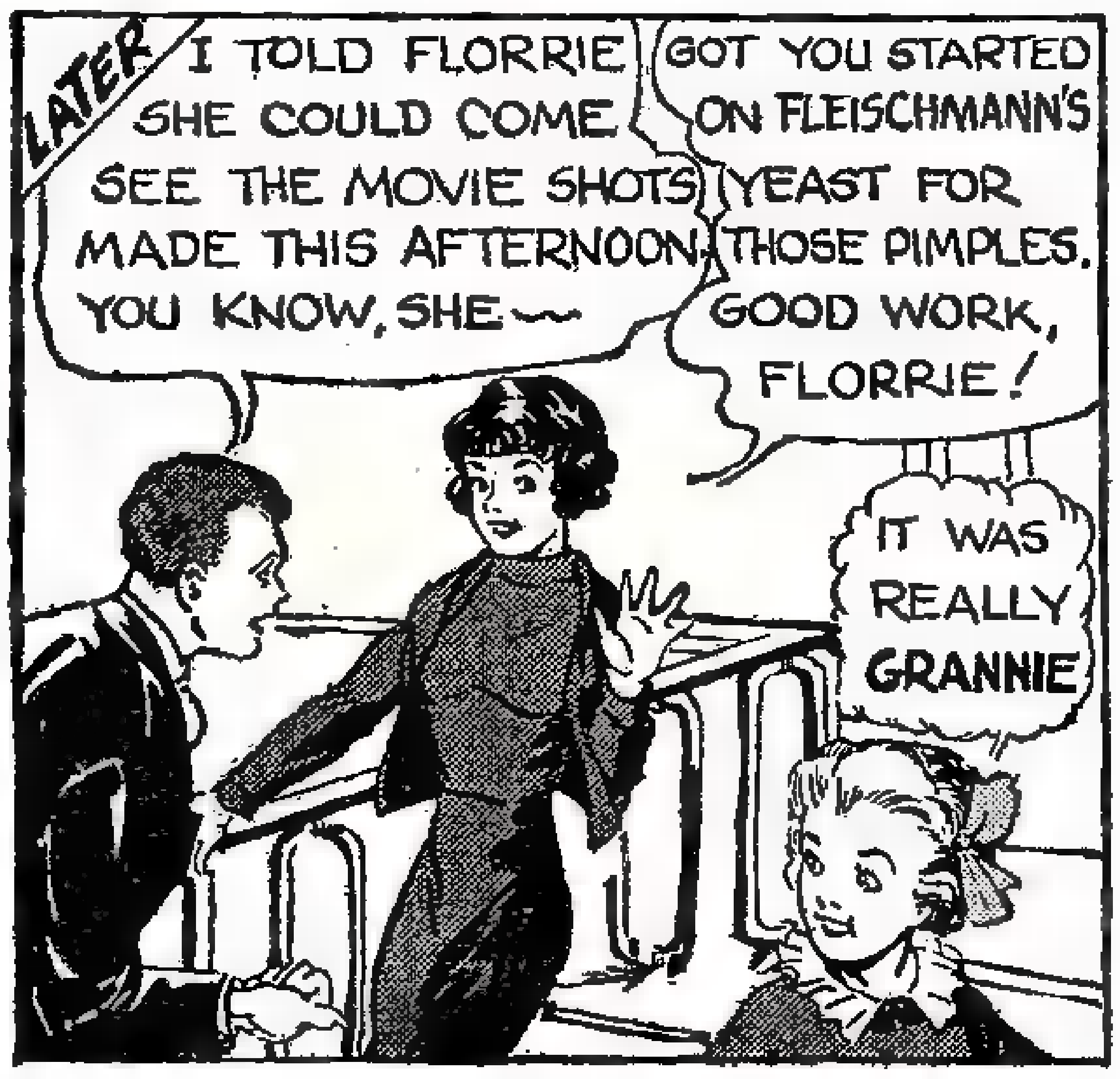
(Editor's Note: Your questions will be answered personally and free of charge by MM experts provided they do not require special research or involve trade secrets. Names and addresses of manufacturers of new products described in this issue can also be obtained free upon request. Enclose a self-addressed and stamped envelope for reply. Address: Problems Editor, Modern Mechanix Publishing Co., Greenwich, Conn.)


"Picture these pimples in a movie close-up!"

Little sister Florrie helps Dave to star in the high school movie . . .


GREAT NEWS, FELLAS! MY UNCLE WALT WILL HELP OUR CLASS MAKE A MOVIE! AND HE'LL LOAN HIS CAMERA ~ PROJECTOR ~ EVERYTHING!
GEE WHIZ!
OH BOY!
UNCLE WALT'S GOT A SPECIAL CLOSE-UP LENS ~ NOW YOU, DAVE, I EXPECT WILL BE THE HERO!
NO CLOSE-UPS OF ME ~ NOT WITH ALL THESE PIMPLES!


GRANNIE ~ THEY WANT DAVE FOR THE HERO IN HIS SCHOOL MOVIE ~ HIS GIRL IS TO BE HEROINE! BUT DAVE'S GOT TERRIBLE PIMPLES!
LAND SAKES, CHILD, FLEISCHMANN'S YEAST IS THE THING FOR PIMPLES! I'LL GET YOU SOME FOR HIM TO START ON
SCRAM, FLORRIE! I'M BUSY!
JUST A MINUTE, PLEASE! GRAN SAYS THIS FRESH YEAST TAKES PIMPLES AWAY. IT MIGHT, EVEN IN TIME FOR THAT MOVIE. OH, DAVY, DO TRY IT!


LATER
I TOLD FLORRIE SHE COULD COME SEE THE MOVIE SHOTS MADE THIS AFTERNOON. YOU KNOW, SHE ~
GOT YOU STARTED ON FLEISCHMANN'S YEAST FOR THOSE PIMPLES. GOOD WORK, FLORRIE!
IT WAS REALLY GRANNIE

Don't let Adolescent Pimples keep YOU out of the limelight

After the beginning of adolescence—from about 13 to 25, or even longer, important glands develop and final growth takes place. This causes disturbance throughout the body. The skin gets oversensitive. Waste poisons in the blood irritate this sensitive skin. Pimples appear.

Eat Fleischmann's Yeast to clear these skin irritants out of the blood. Then, pimples vanish. Start eating 3 cakes a day, before meals—plain, or in a little water—until your skin clears!

—clears the skin
by clearing skin irritants out of the blood

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COSTS NOTHING to get complete facts. Just send name and address. We'll send description of simple hand machine that quickly slices old tire into strips; show you how patented method forms strips into thick, springy, long-wearing **FABRIX** Mats—how five cents worth of Junk Tires makes $2.00 Mat; how you can start on a reasonable investment and build [illegible] business so big, so fast, that it will take your breath away. Don't delay [illegible] minute. Write or wire today. All information is free.

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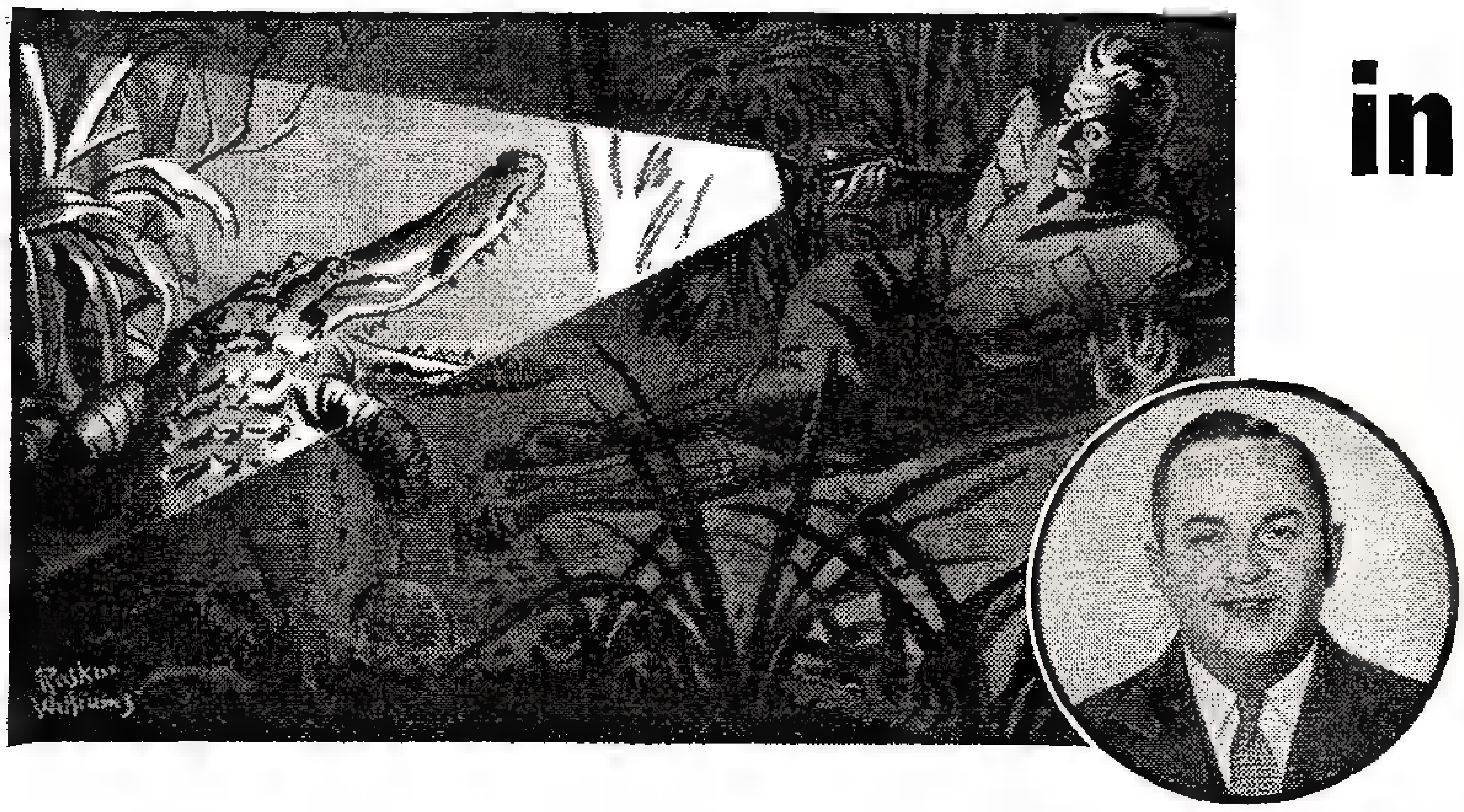
He Stumbled over a MAN-EATER in the Dark


Ruskin Williams

Soldier of Fortune lives to tell the story of a jungle combat between man and beast.

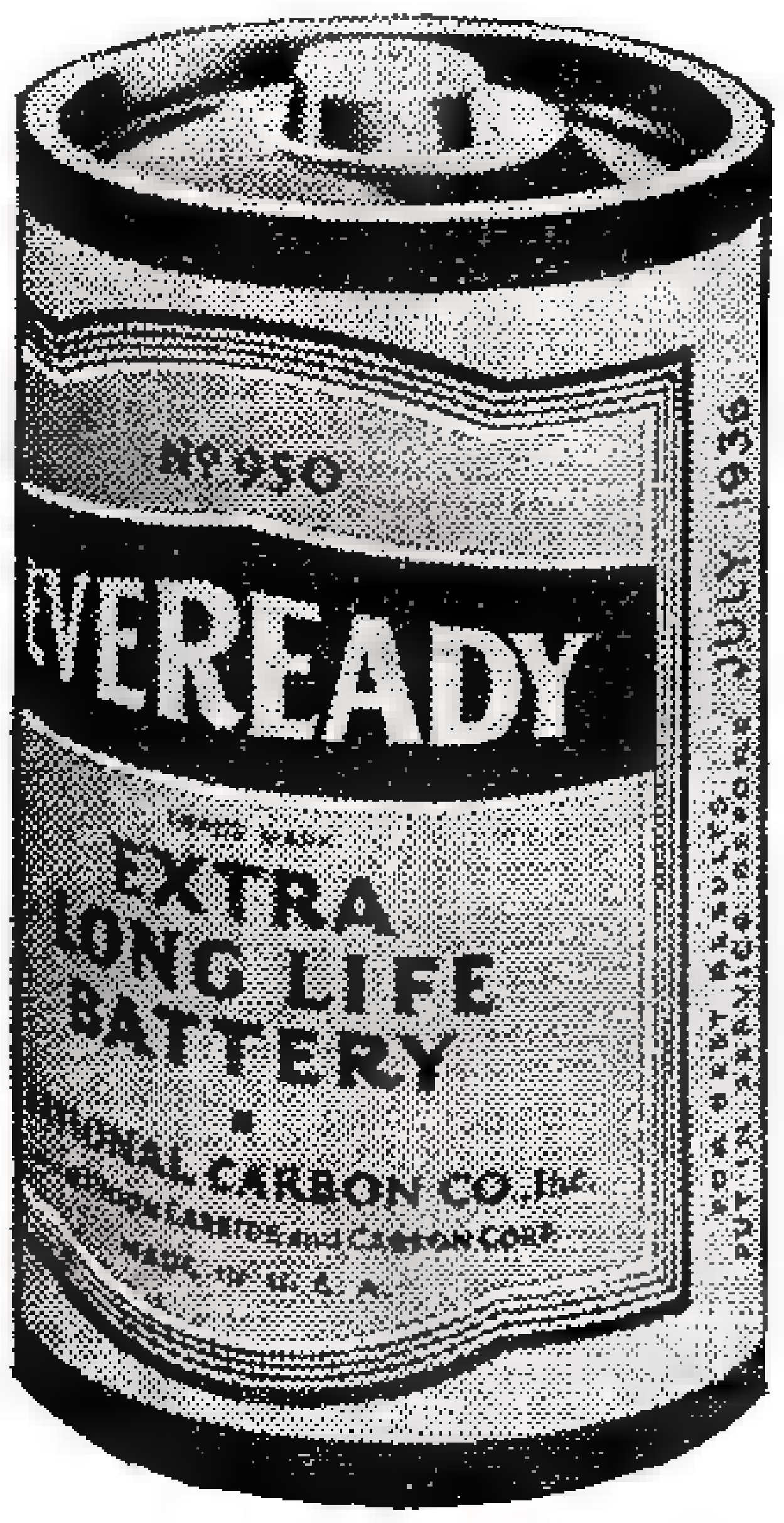
"It was a black, moonless tropic night," writes Gardner K. Hussey, "but I trudged along the familiar jungle path in the dark with assurance. It was the path from my timekeeper's shack to the house where I slept. Without warning I stumbled and fell headlong. There was a hissing noise followed by a sharp click. I scrambled to my feet and reached for the Eveready Flashlight in my belt . . . Within three feet of me was a huge thrashing *alligator,* his jaws snapping like castanets.

"If my light had failed at that moment, if it were not for the *fresh* strong Eveready Batteries in my flashlight, they would probably have found some of me on that path next morning. I might even have lived...but not with all my arms and legs.

"Nearby was a boiler-room. I made for it and with the aid of a slice-bar finally finished that ghastly survivor of the prehistoric beasts.

"I think there are perhaps two morals to this story:

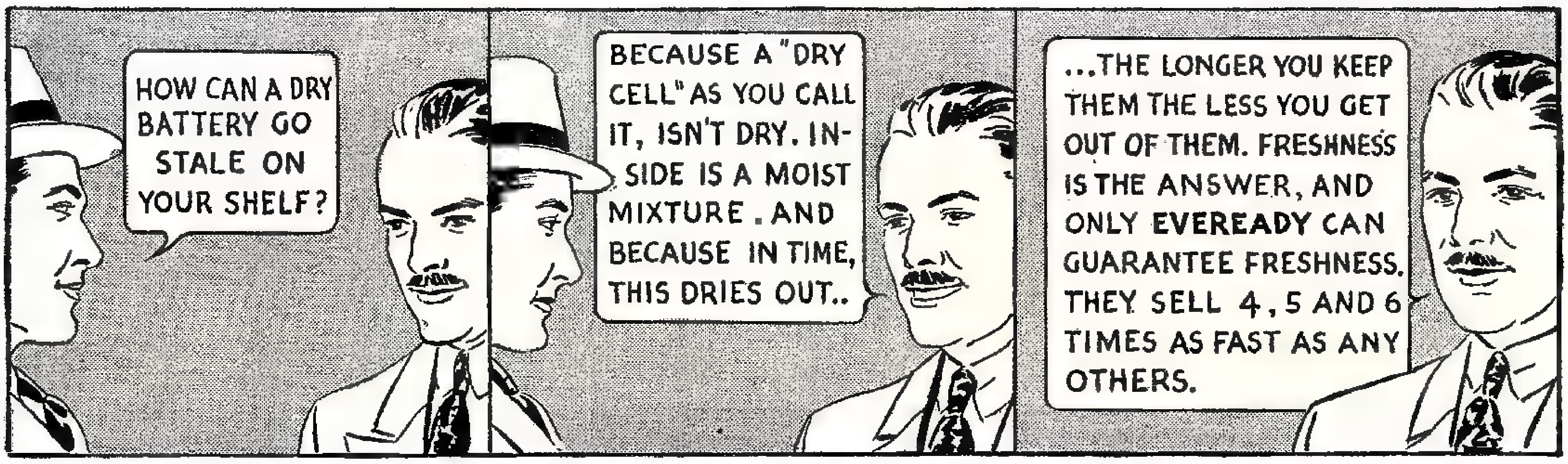
"First, I owe life and limb to fresh Eveready Batteries, that gave me light when I had to have it. Second, if I had been using my flashlight on that trail, I would have entirely avoided the fright of my life. No one needs to tell me now that unexpected perils lurk in familiar paths."


No 950
EVEREADY
EXTRA LONG LIFE BATTERY
NATIONAL CARBON CO. Inc.
JULY 1936

EVEREADY BATTERIES ARE *FRESH* BATTERIES

***Once more the* DATE-LINE is a LIFE-LINE**

NATIONAL CARBON COMPANY, INC.
30 East 42nd Street, New York, N. Y.


HOW CAN A DRY BATTERY GO STALE ON YOUR SHELF?
BECAUSE A "DRY CELL" AS YOU CALL IT, ISN'T DRY. INSIDE IS A MOIST MIXTURE. AND BECAUSE IN TIME, THIS DRIES OUT..
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FOR INVENTORS
And Mechanical Minded Men

How TO OBTAIN A

Answers to Questions on Page 131

1 By patenting the invention.

2 Send sketch or model and description with search fee to a registered patent attorney.

3 1101 U. S.—1279 Foreign.

4 Abraham Lincoln.

5 17 years.

6 It confers on patentee the exclusive right to make, sell and use the invention covered by the patent.

7 No. Pencil sketch and description will usually suffice.

8 A form on which an inventor may execute his sketch and description. When properly filled out it is documentary evidence of your conception of the invention.

9 Because a layman or a lawyer in general practice is not learned in patent office practice.

10 As soon as patent application covering the invention is filed in United States Patent Office and official receipt received.

CLARENCE A. O'BRIEN
and Hyman Berman
317-F Adams Building
Washington, D. C.
Registered Patent Attorneys Before U. S. Patent Office
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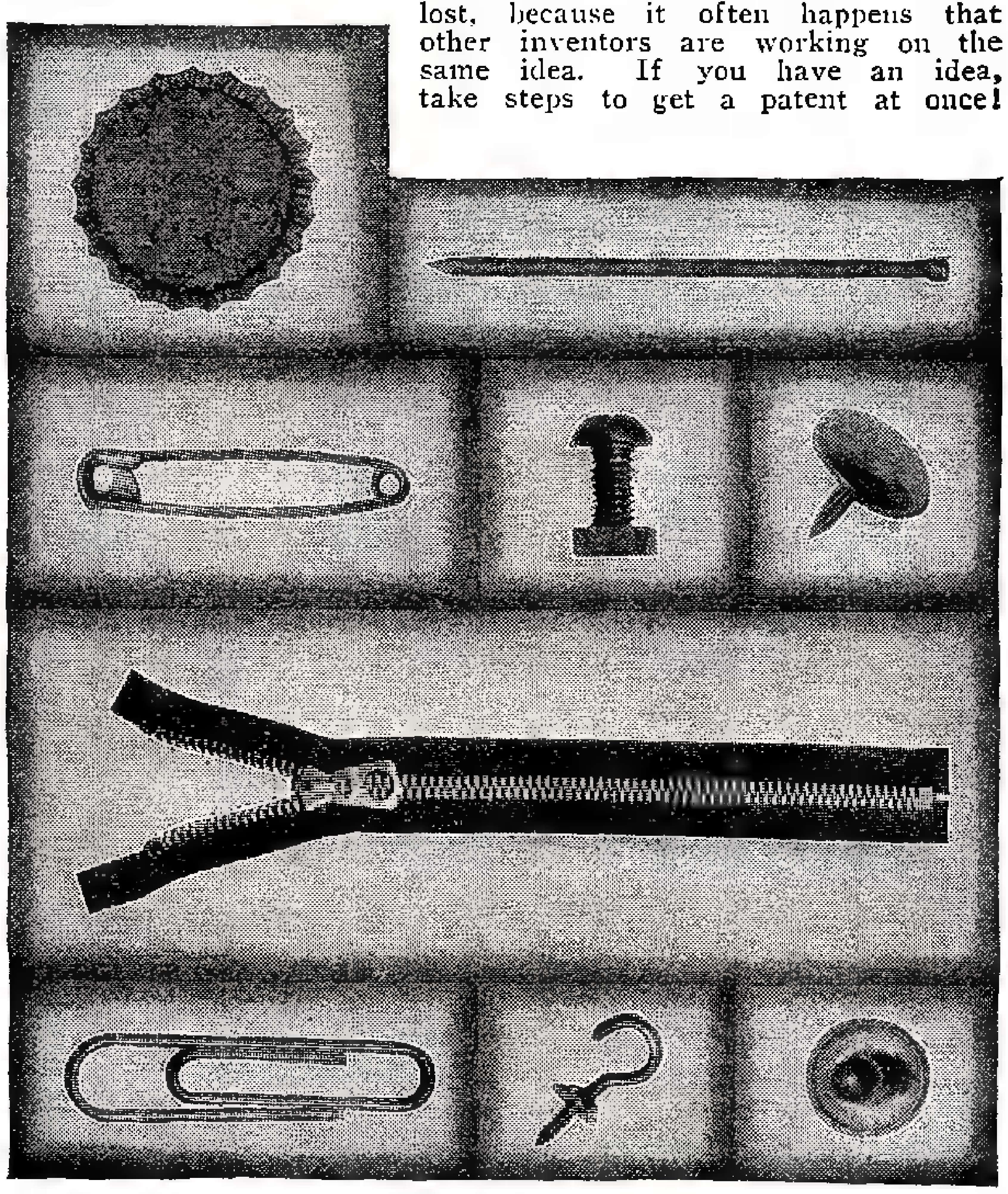
Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a United States Government Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, take steps to get a patent at once!



THE FREE BOOK shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing—securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

PATENT

KNOW HOW to START
KNOW EACH STEP to TAKE

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Immediate Search Necessary

A Search at the U. S. Patent Office will disclose one of three things: That you have hit upon an entirely original idea—that you have suggested patentable improvements upon an existing invention—or that your invention has been anticipated throughout, and you should drop it. You should have this information at once. The next steps (the whole procedure of obtaining a patent) will be thoroughly explained to you in our FREE BOOK.

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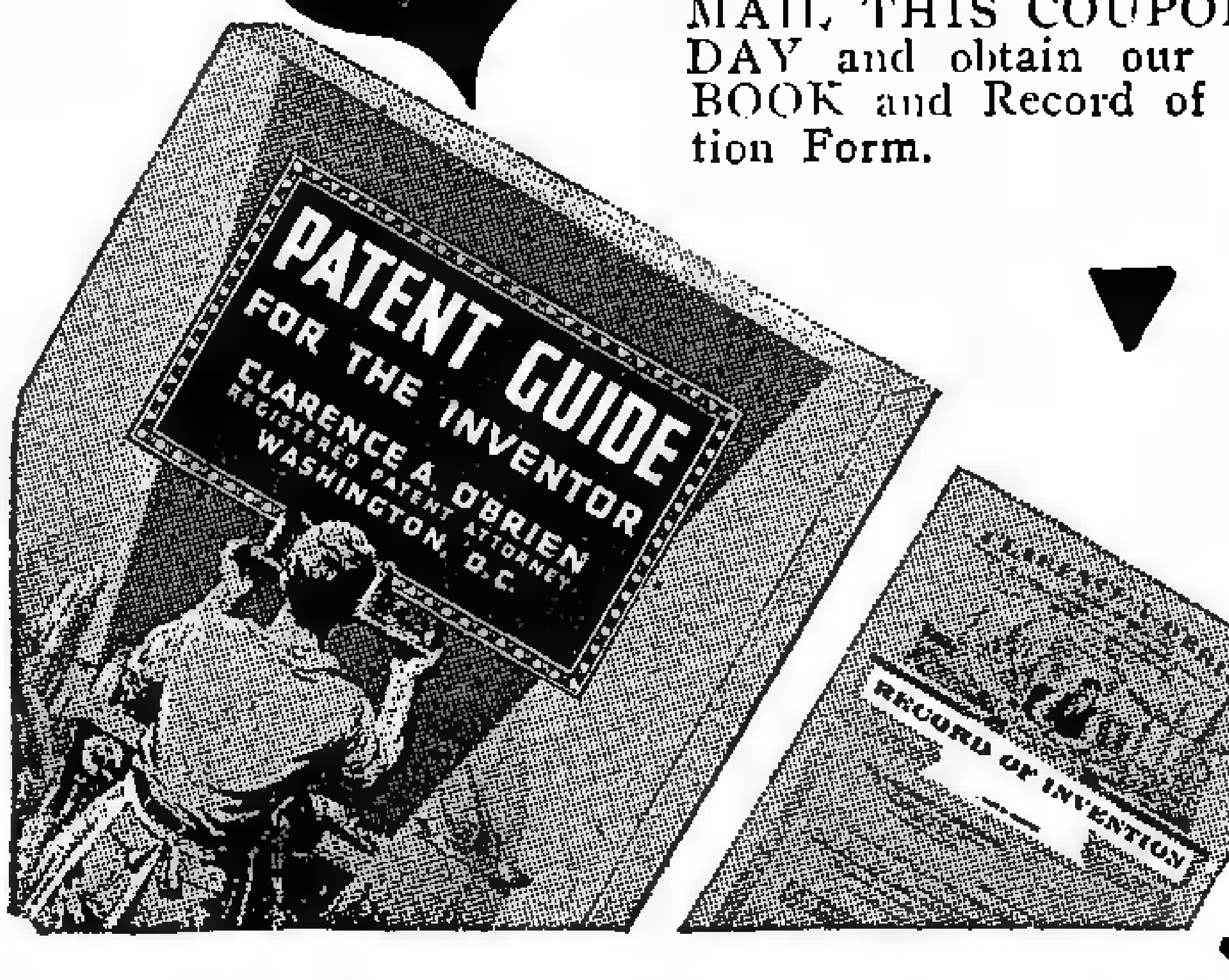
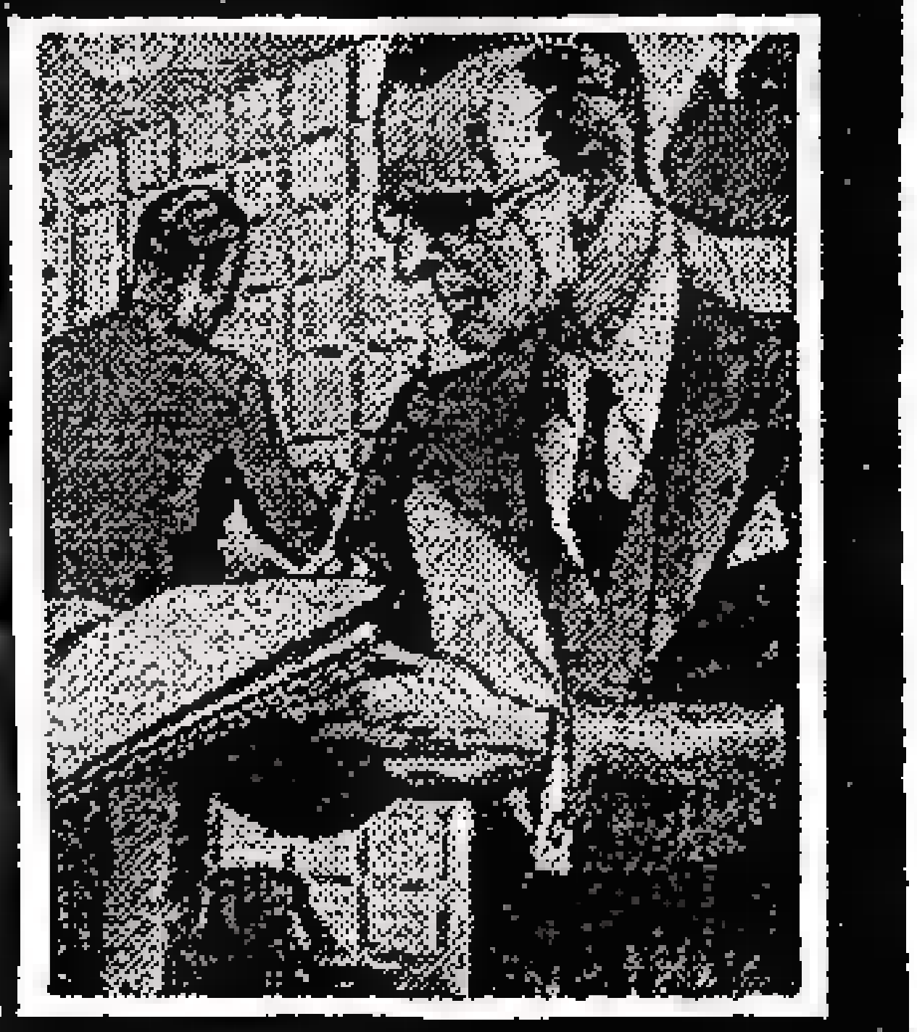


STEP No. 1

Make a rough pencil sketch of your invention, describe it fully, and send it to us for preliminary search through U. S. Patent Office.

STEP No. 2

Our trained searchers will then make a preliminary search of the pertinent U. S. Patents to determine if your invention is probably patentable.



STEP No. 3

Our complete report of search and opinion on patentability will be mailed to you with copies of U. S. Patents that we consider nearest to your invention.

STEP No. 4

If you decide to make patent application, for customary fees explained in our booklet, our draftsmen will make drawings and proper papers will be prepared for presentation of your invention to the Patent Examiner.

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& Hyman Berman
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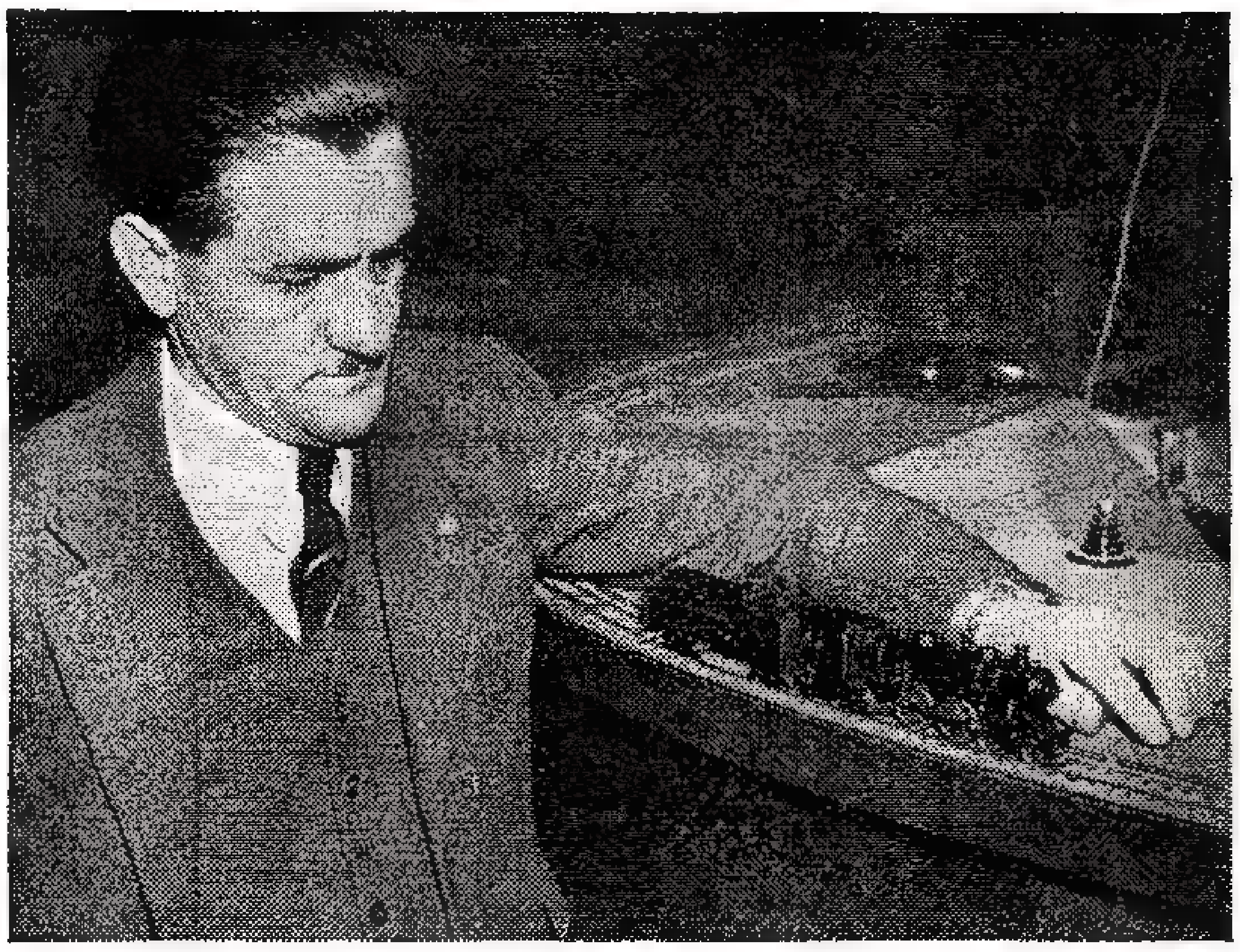
Random Chips from

BOATS, boats, boats and more boats. The spring rains are certainly turning MM's workshop fans into boat builders and it looks like this summer will find hundreds of our readers out on the lakes and rivers in their own craft. Our recent edition of *How To Build 20 Boats* is going fast. Now is the time to get your copy (it's 50 cents) and get started on a practical boat for summer cruising, sailing or fishing. Or if you wish, you can get a copy of MM's free Blueprint Catalog, which contains descriptions of a whole assortment of boats, from 7-foot *Tar Baby* to the 30-foot ocean cruiser *Tahiti,* more than 40 boats in all.

***

We were down to see the eighth annual exhibition of the New York Society of Model Engineers recently and one of the first things we saw was a model of our *Tiny Tom,* the OO gauge pencil-length locomotive which appeared in our November, December and January issues as well as in our 1936 *How-To-Build-It Book.* We lost no time in getting in touch with its maker, William Pinter of Garwood, N. J. We asked him why he happened to build *Tiny Tom* and he answered with this letter and photograph to win our first prize of $5:

> Garwood, N. J.
>
> Dear Editor:
>
> Here is the story of how I happened to build your *Tiny Tom.* I read several model-making magazines, but I never thought of *Modern Mechanix* until, in November, 1935, a fellow model maker presented me with a copy of your publication. I liked the way you detailed your drawings of models, which, by the way, I do not find in other magazines. As these drawings make it very simple and easy for anyone without experience to construct any of your models, and as I was especially taken with the model of *Tiny Tom,* I decided to build this small locomotive in my spare time.
>
> I did not use any castings in the model, all parts being made by me by hand, turned off a lathe. The drive wheels were built up of brass and, in fact, brass and sheet zinc was used throughout the whole model. Zinc is very nice to work with in model work, it being easy to form and it makes a very neat soldering job. For power I used a miniature 6-volt motor which I purchased several years ago.
>
> I have been building models for some years in O gauge but this being much too large for an indoor layout, I decided to switch to OO gauge.
>
> I would appreciate it very much if you would publish more rolling stock and track layouts in your valuable magazine, preferably to scale. I am sure that not only myself but many of your readers would be glad to see this information in your periodical.
>
> William Pinter.



Here is "Tiny Tom", MM's pencil length locomotive, in all his glory at the New York Model Engineers exhibit recently. "Tiny Tom" and his maker, William Pinter, steam off with first prize of $5 this month. Note detail of this perfect model.

It is letters like that that gladden the heart of any editor. As for the plans for rolling stock and track layouts that Mr. Pinter asks about, we knew those requests would come pouring in and so in our April issue we put in plans for everything, from flat car to caboose.

***

Our second prize letter and photograph was sent in by Gene Caswell of Miami, Fla., who did some fast work on building the record breaking model plane which appeared in our March issue. You all know, of course, that each month we award three prizes for the best letters and photographs sent in to the Editor's Workbench. First prize is $5, second prize is $3, and third prize is $2. Speaking of prizes, don't overlook our big $1,000 cash contest which tests your knowledge of cars. Details appear on page 48. Gene's letter follows:

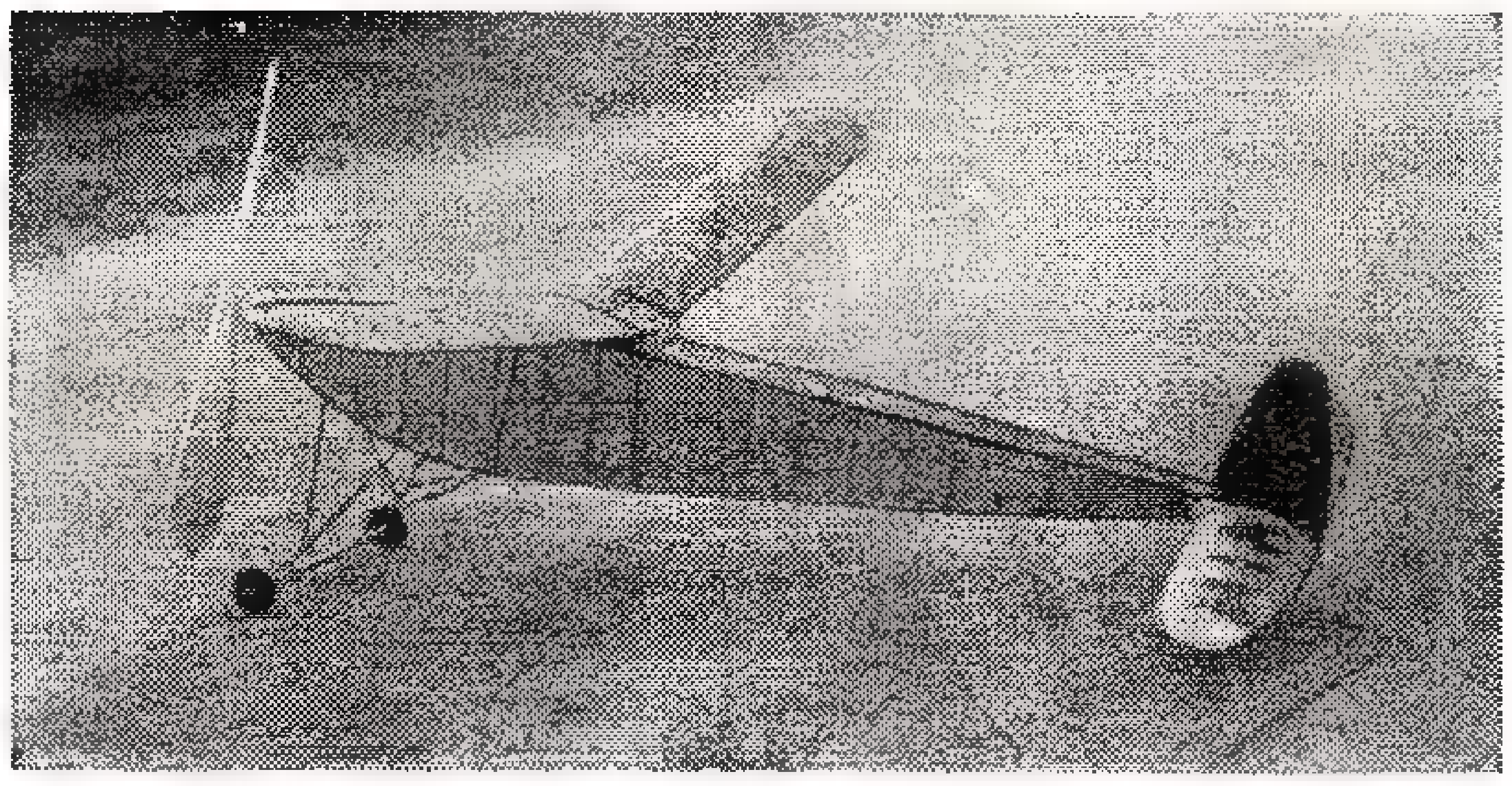
> Miami, Fla.
>
> Dear Editor:
>
> I have enclosed a snapshot of the model

the Editor's Workbench

plane I built from the plans that appeared in the March issue of MM. The ship performed fine on its trial flights. I tried to obtain an action picture of the plane but it was too fast for me.

I enjoy every page of your magazine including the ads, and, of course, especially anything about aviation and model building as I am a model fan.

Gene Caswell.



"Too fast for the camera" was this record breaking model plane, and so her builder, Gene Caswell, photographed her standing still to win second prize. He built her from plans appearing in the March MM and finds her the real thing.

***

Because of the good job George V. Piver of Beaufort, N. C., did in building *Nomad*, one of the boats whose plans are published in our recent edition of *How To Build 20 Boats,* we are awarding him the third prize this month. You can see why when you read his letter, which follows:

Beaufort, N. C.

Dear Editor:

I am sending you some snapshots of my *Nomad* which I built last fall. She was designed for inland waters but has proven seaworthy. I have used her for trolling for blue fish at Beaufort Inlet and she is more seaworthy than some of the larger boats here.

So far I have raced seven boats and beaten them all, and I haven't much sail, as you can see by the photo. I have had 1,290 pounds in her and had plenty of room to spare.

I am building a camp trailer now and will send a photo soon. I never miss a copy of your magazine. Let us have some more boat plans.

George V. Piver.

"She is more seaworthy than some larger boats here," writes George Piver in describing his *Nomad*. His boat won 3rd prize of $2.

As long as we are on the subject of boats, we might mention that the boating bureau of the Outboard Motors Corporation of Milwaukee, Wis., has compiled a list of 188 outboard boat builders in all parts of the country. Just drop them a line and you will get the list free.

***

Dr. Paul W. Bemis of Everett, Mass., states in a letter: "I have a very beautiful workshop with about $5,000 invested and work in metal and wood. I enjoy your publication and have been a reader from almost its inception." What is your shop worth?

***

C. E. Dawe of Spokane, Wash., describes his shop as follows: "I have a wood working shop, lathe, jig saw, jointer, and circular saw, and use it as a hobby, as I like nothing better than to be sawing or working with wood. I buy MM each month from the newsstand and get lots of ideas and enjoyment out of it."

***

Bert Tucker, 184 Coogee Bay Road, Coogee, Sydney, Australia, would like to exchange ideas and news with MM readers anywhere. Here's a good opportunity for stamp collectors.

***

Richard Verreault of Buffalo tells us that in addition to Charles Wittholz the boat, pictured in *How to Build 20 Boats* in connection with Sam Rabl's article on *Sunray,* was built by Paul J. Fries and himself under the supervision of George T. Verreault. The use of Mr. Verreault's shop was one of the main factors in the successful completion of the boat.

***

"In the June, 1935, MM I built your shortwave two-tube receiver," writes Romeo Bartalo of East Boston, Mass. "I logged ten South American

[*Continued on page* 22]

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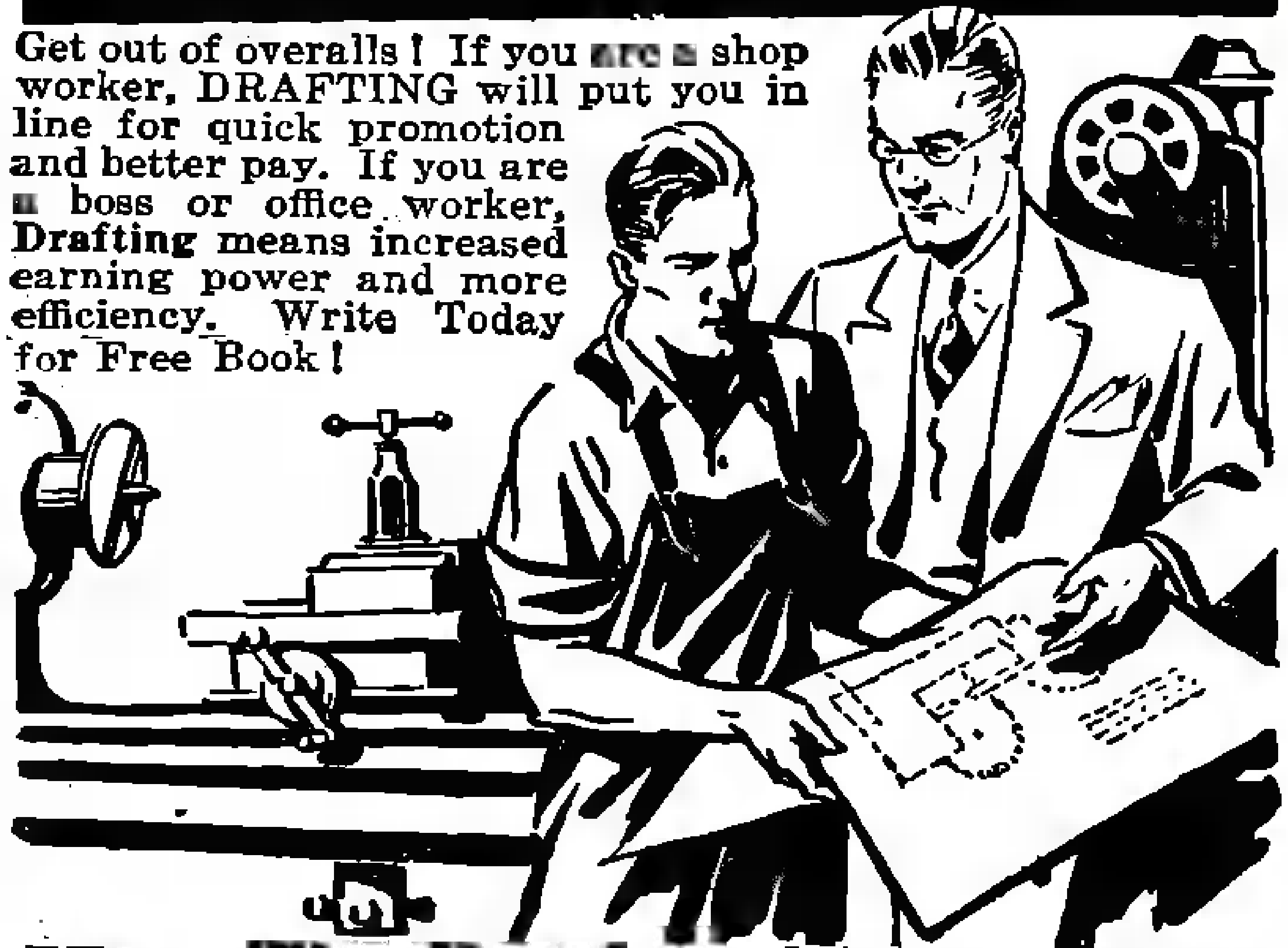

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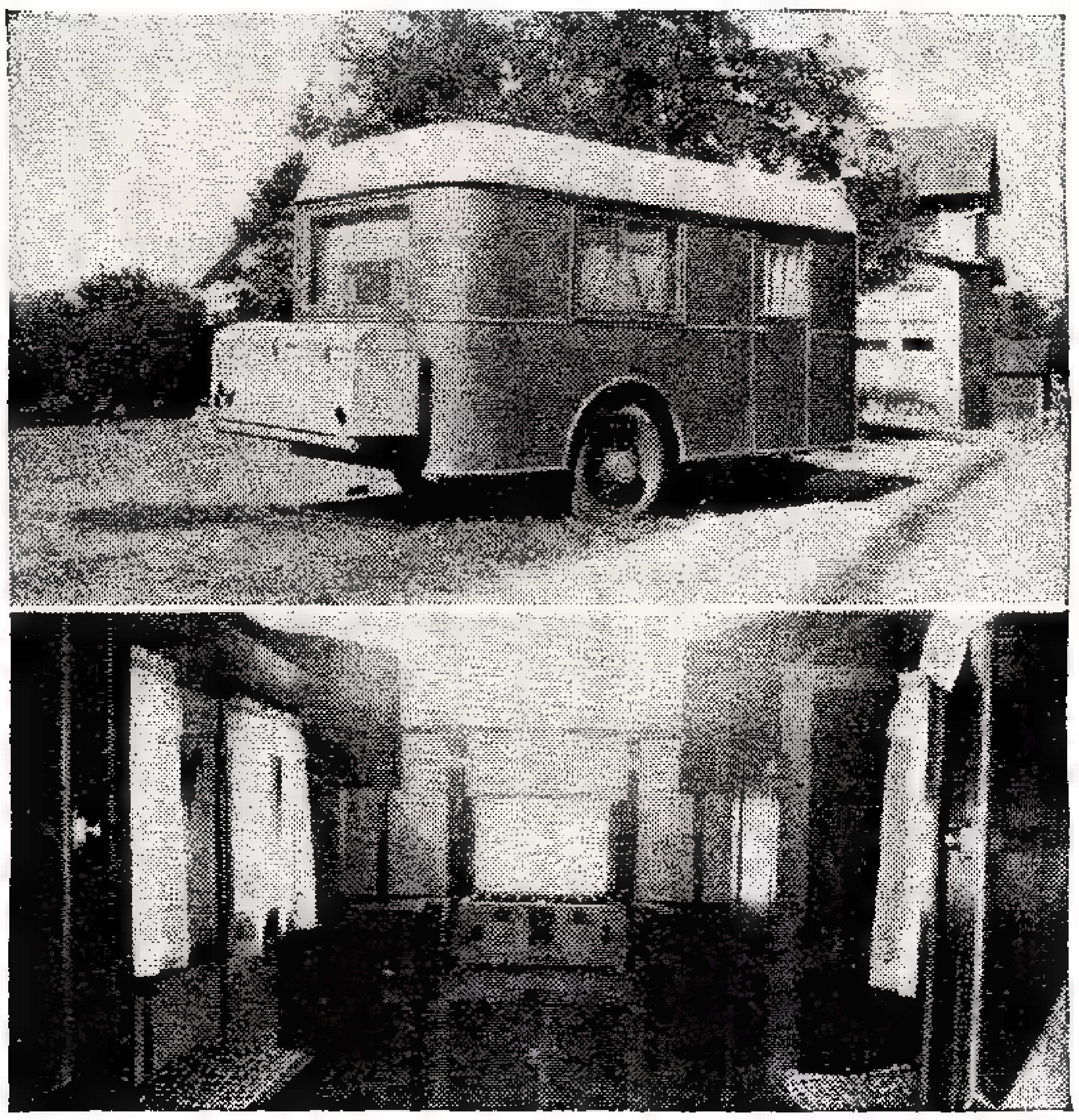
Chips from the Editor's Workbench

[*Continued from page* 21]



William Gudrian built MM's "Wanderer" trailer, but failed to give his address. Photos show exterior and interior. He says: "Trailer is very substantial, easy to handle and well-balanced."

stations, DJC in Berlin, and 12RO in Italy, in addition to amateur phone and American short wave stations."

***

Douglas D. Chent writes from Wanganin, New Zealand: **I am very shortly commencing to build a *Buddy* for I think she is the cutest thing I have ever seen. I could sell my *How to Build 20 Boats* (first edition) for an English pound, but I guess I'll stick to it and charge a pound for a loan.** We'll wager that the new edition of *How to Build 20 Boats* will also join the ranks of rare editions soon.

***

Peter Tomasky of 931 W. 35th Place, Chicago, built MM's radiophone diving helmet (in the *1936 How to Build It*) and is ready to explore Lake Michigan's bottom. He wants to hear from other MM diving fans.

***

From across the seas Ed Boxer and E. Knight of London, England, drop us this note: **We are regular readers of your splendid magazine. We find the radio section of exceptional interest. We haven't got a periodical in this country anything like yours.** They ask for plans for a television receiver, but, as yet, there are not enough television broadcasting stations to make such an article worth while.

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by ARTHUR MURRAY

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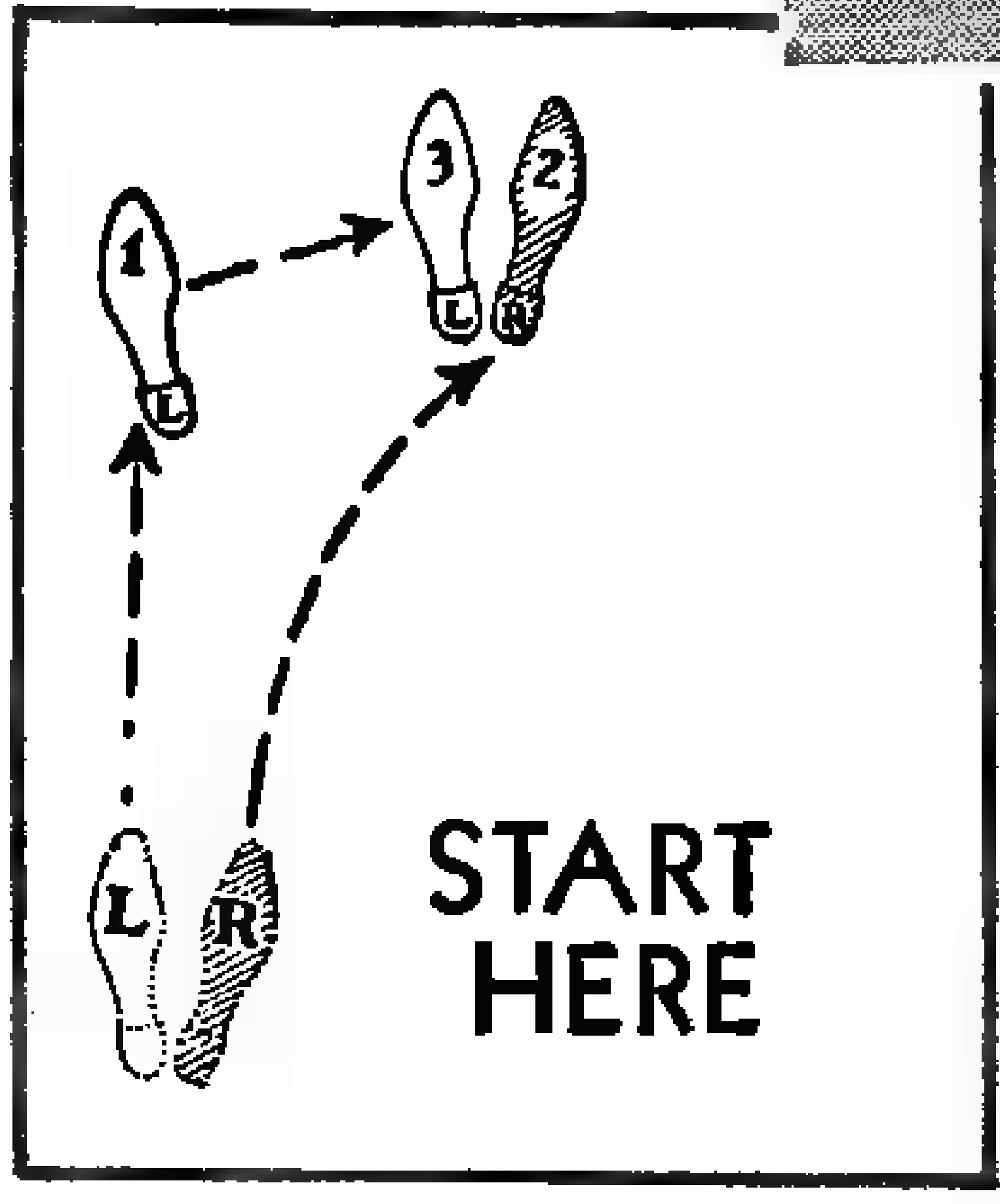

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Herman Wilson.

Clendenin, W. Va.
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Leo Foreman.

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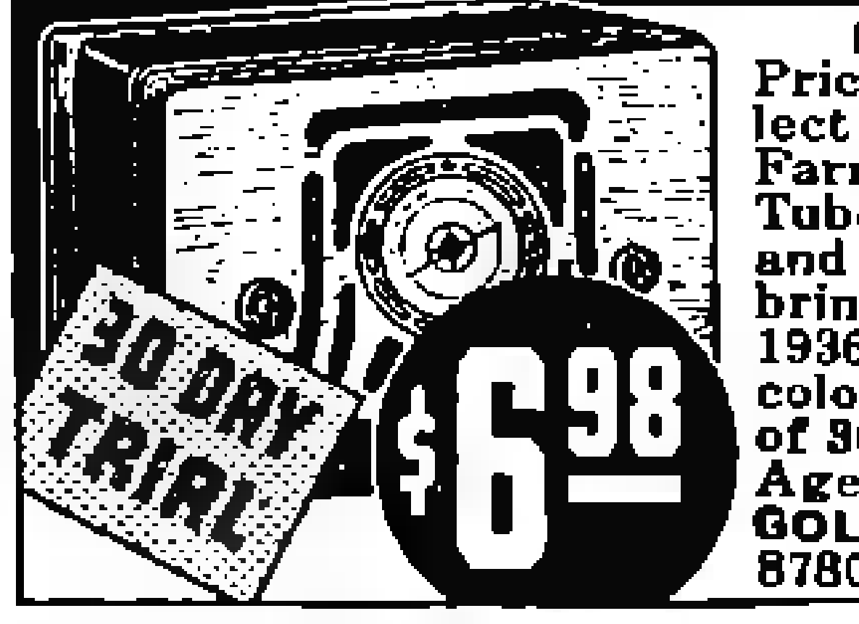

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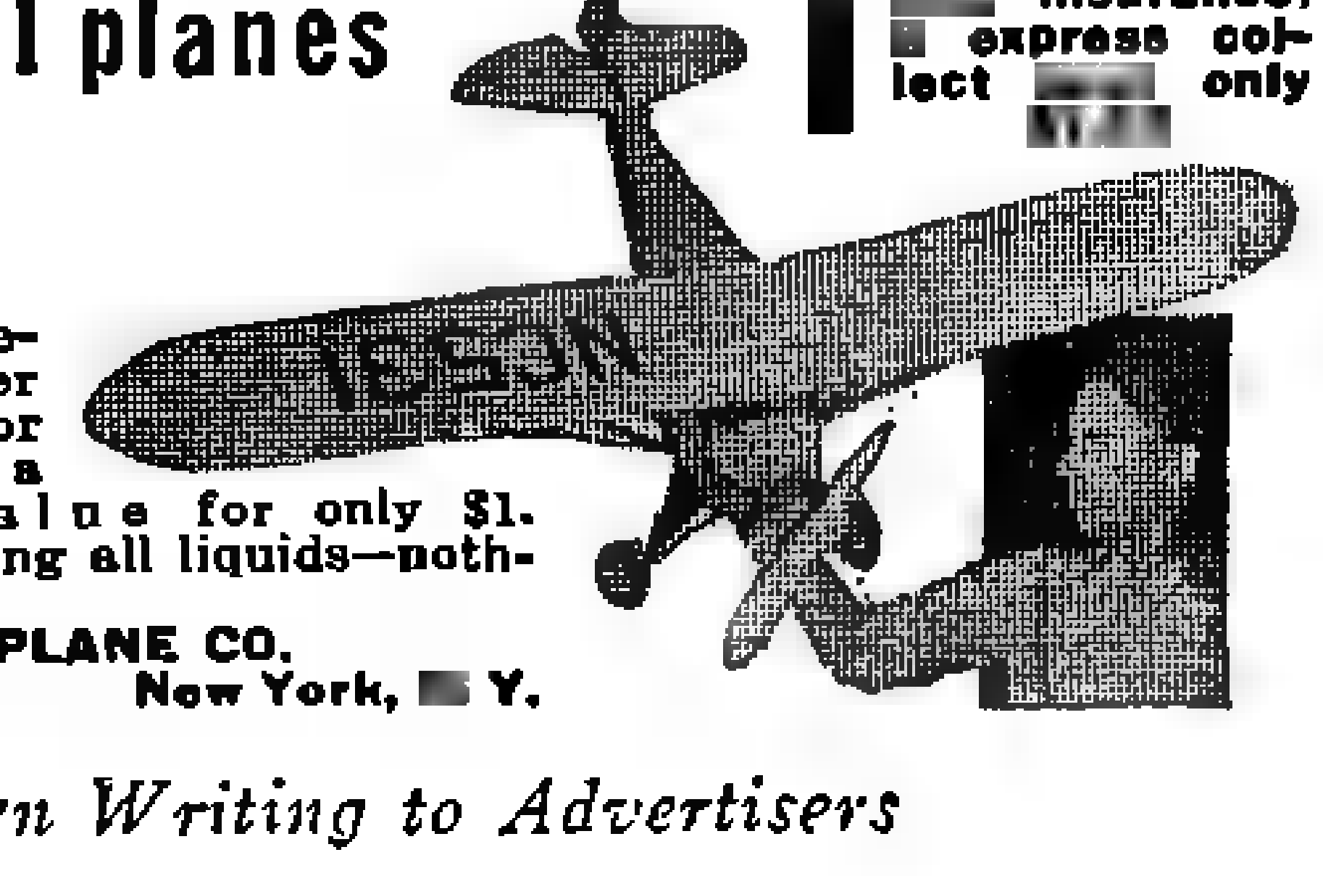

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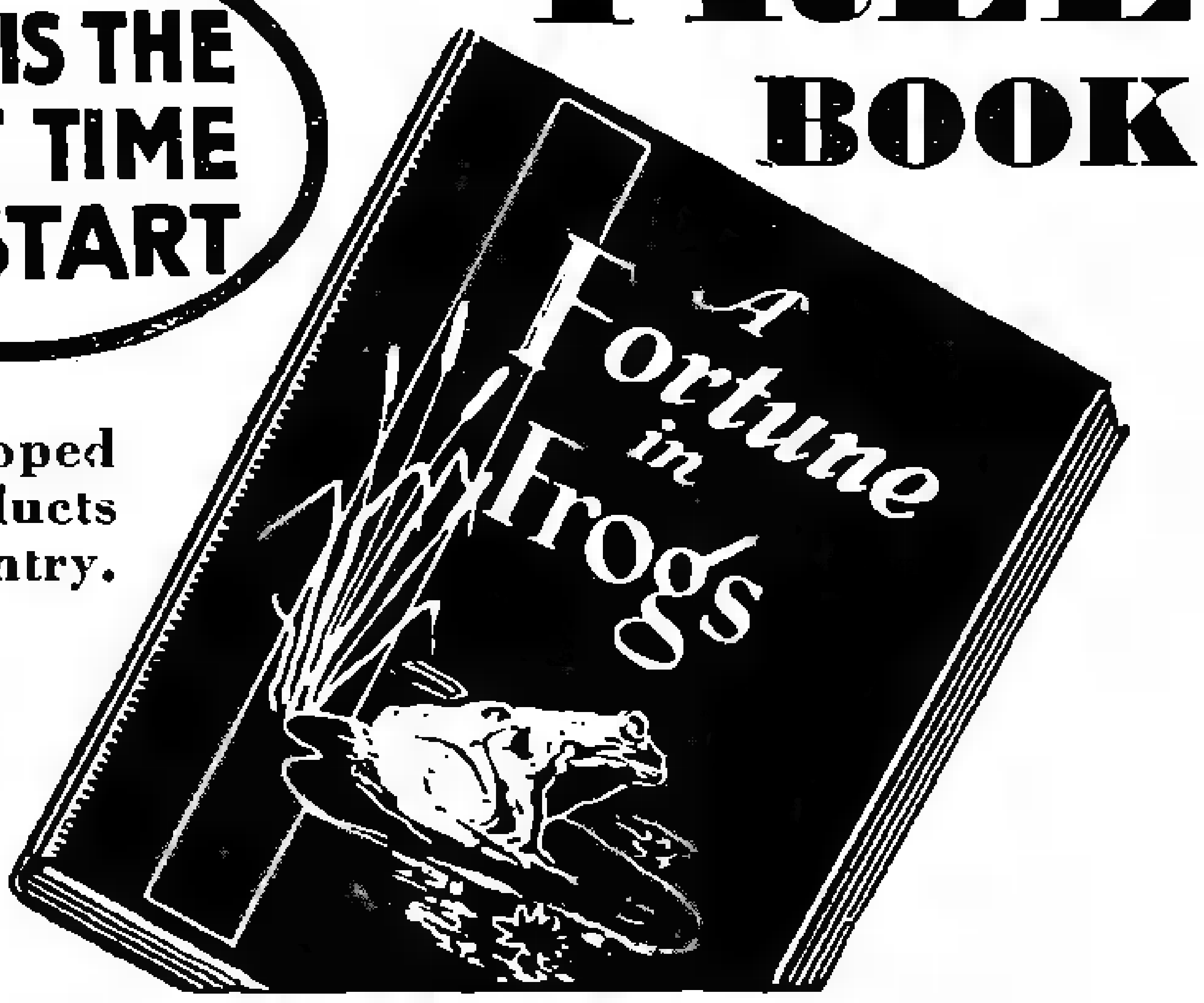

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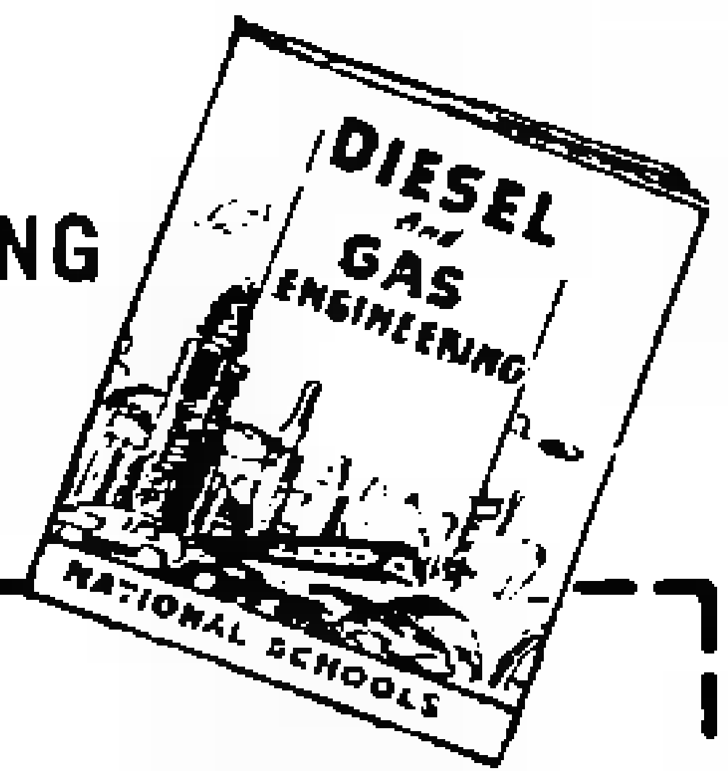

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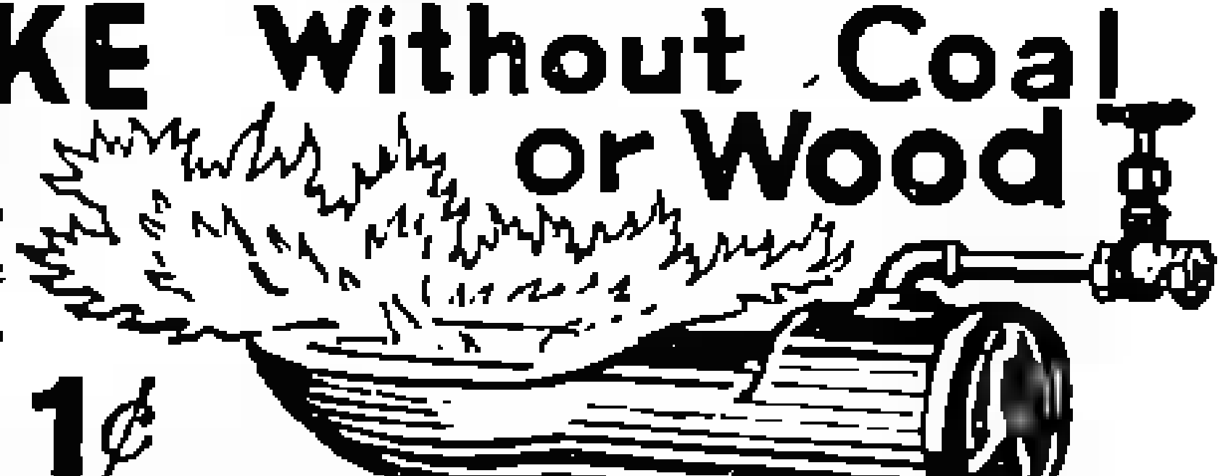

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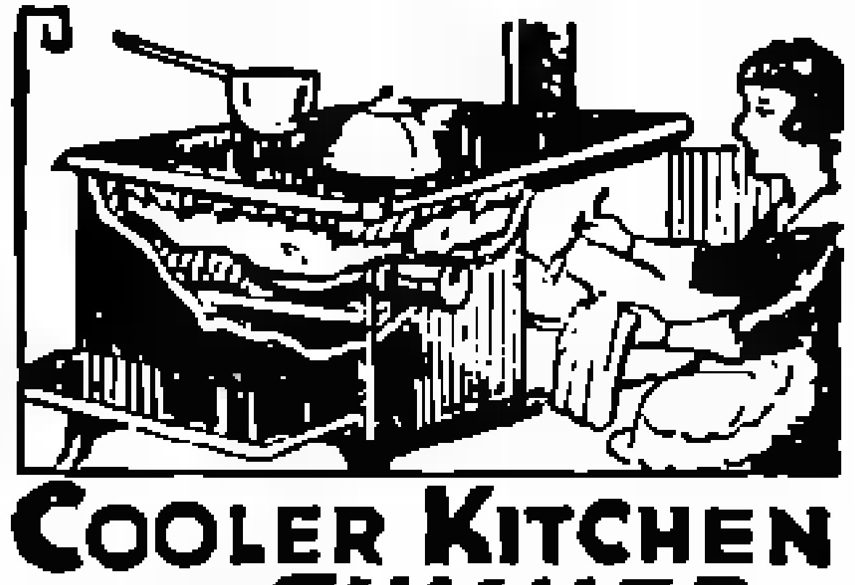

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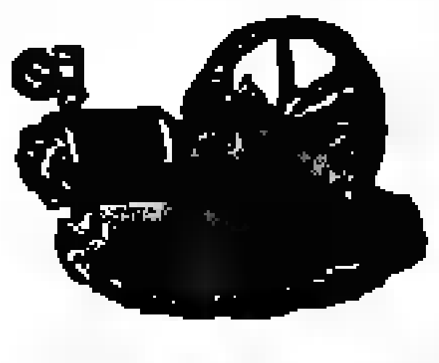

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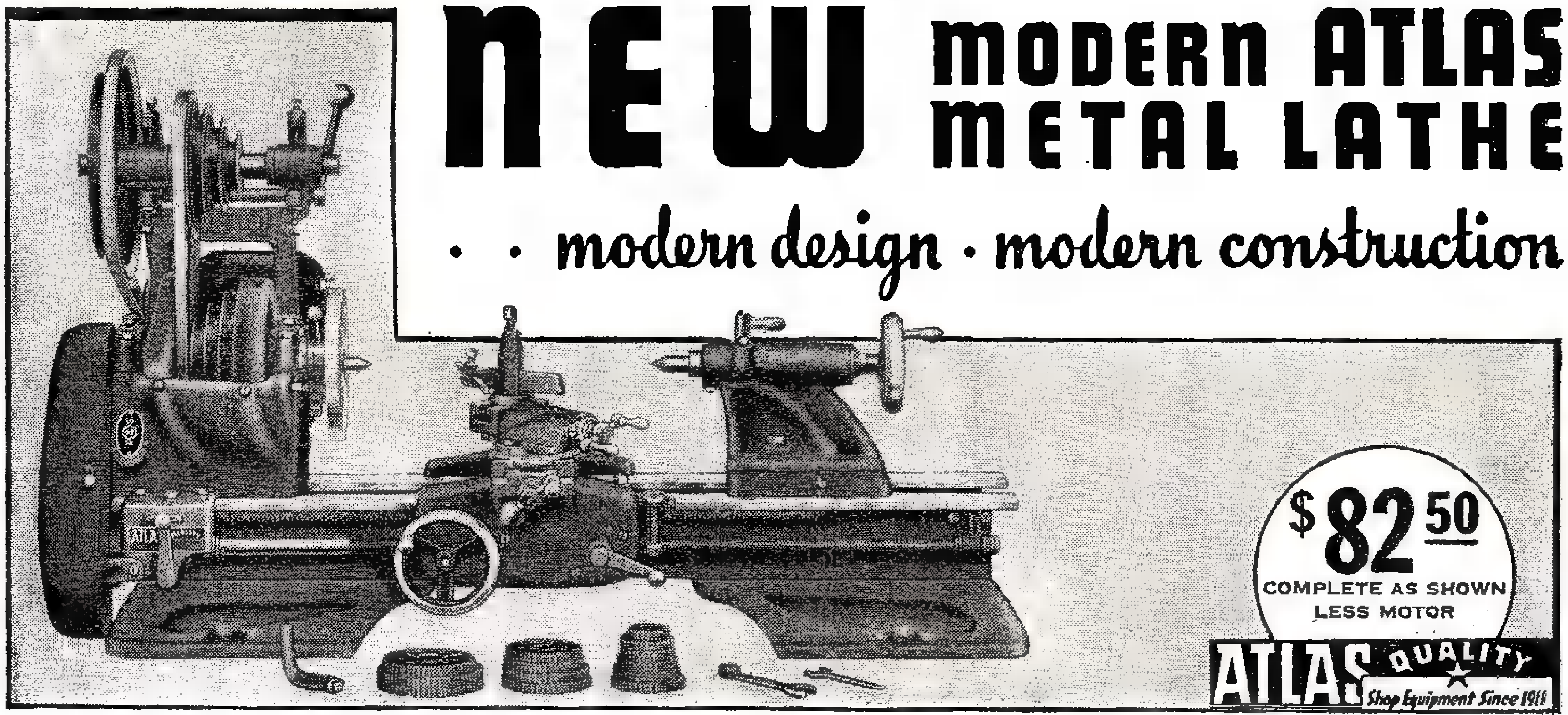

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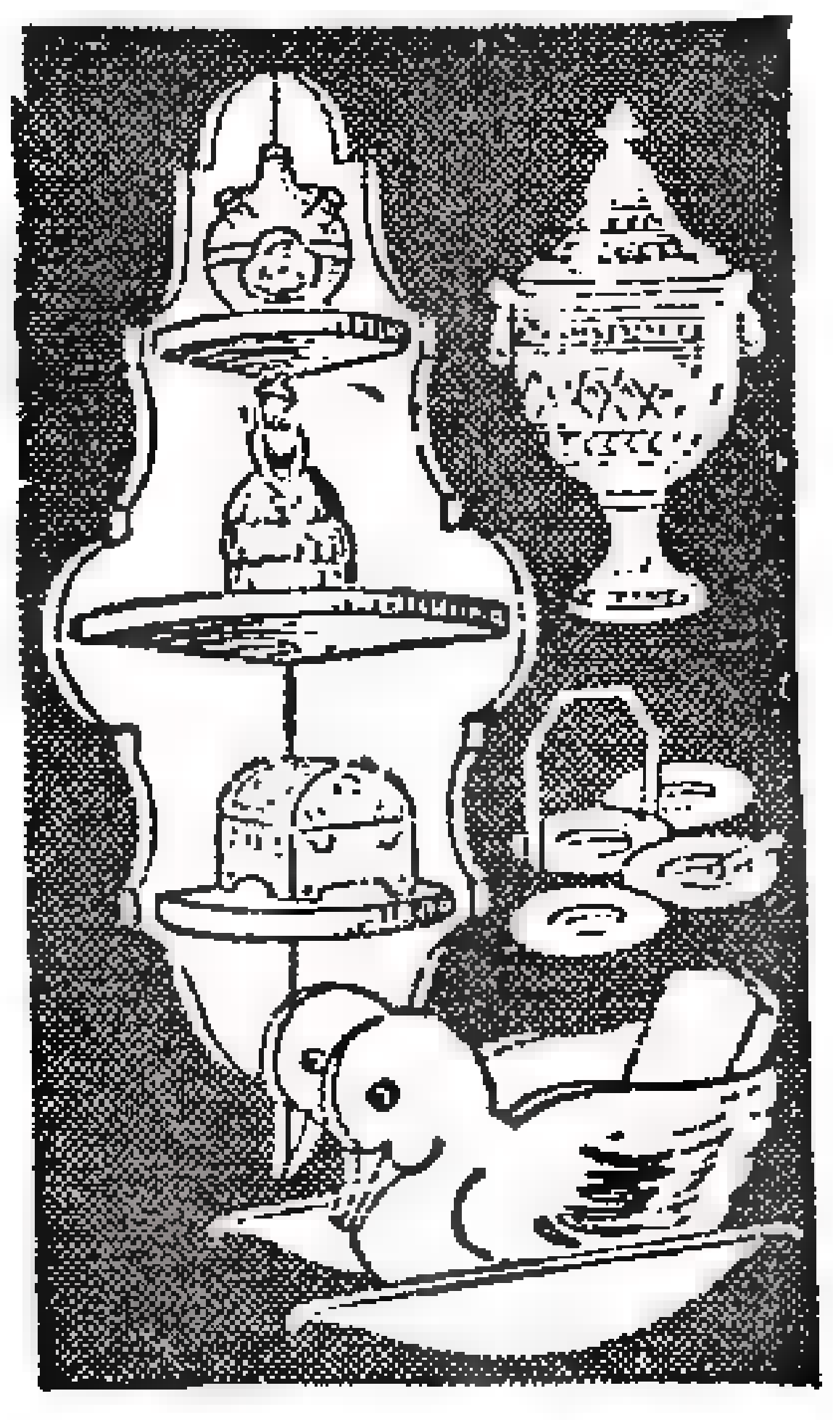

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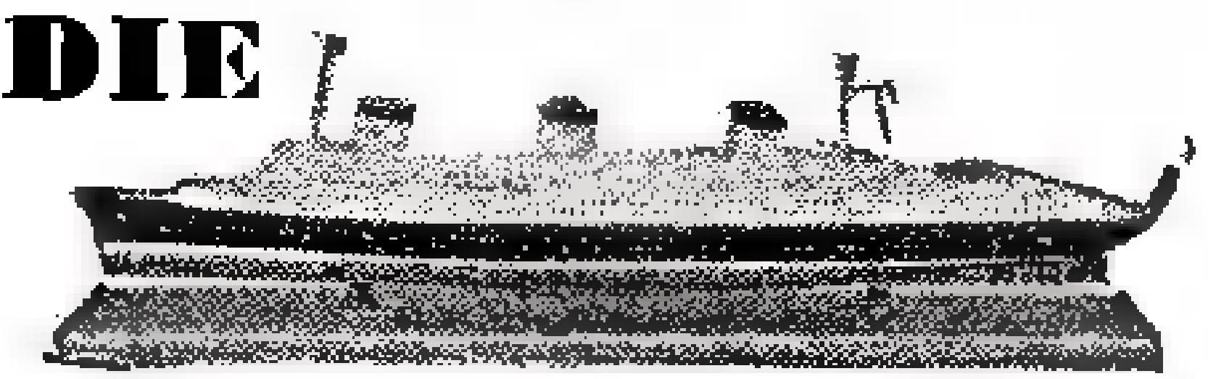

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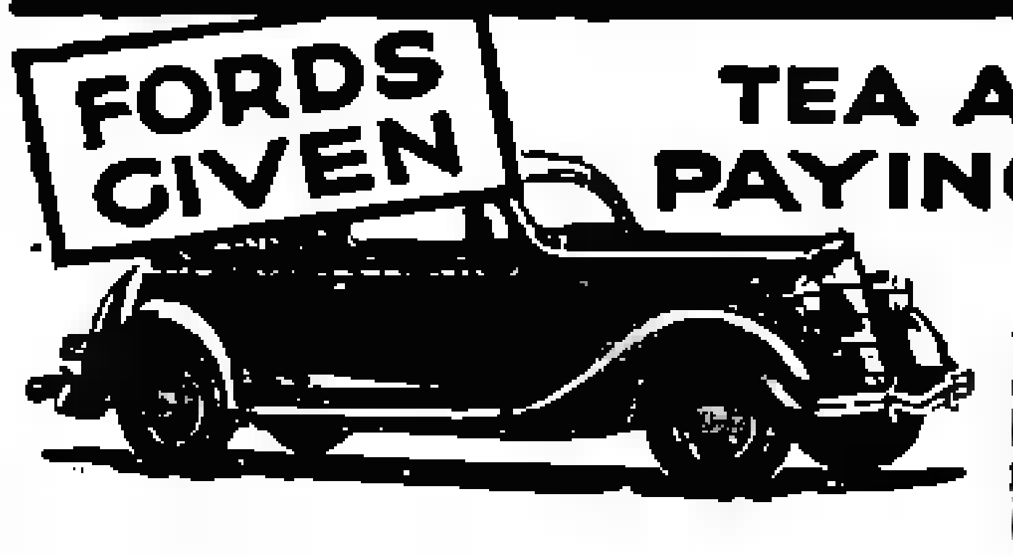

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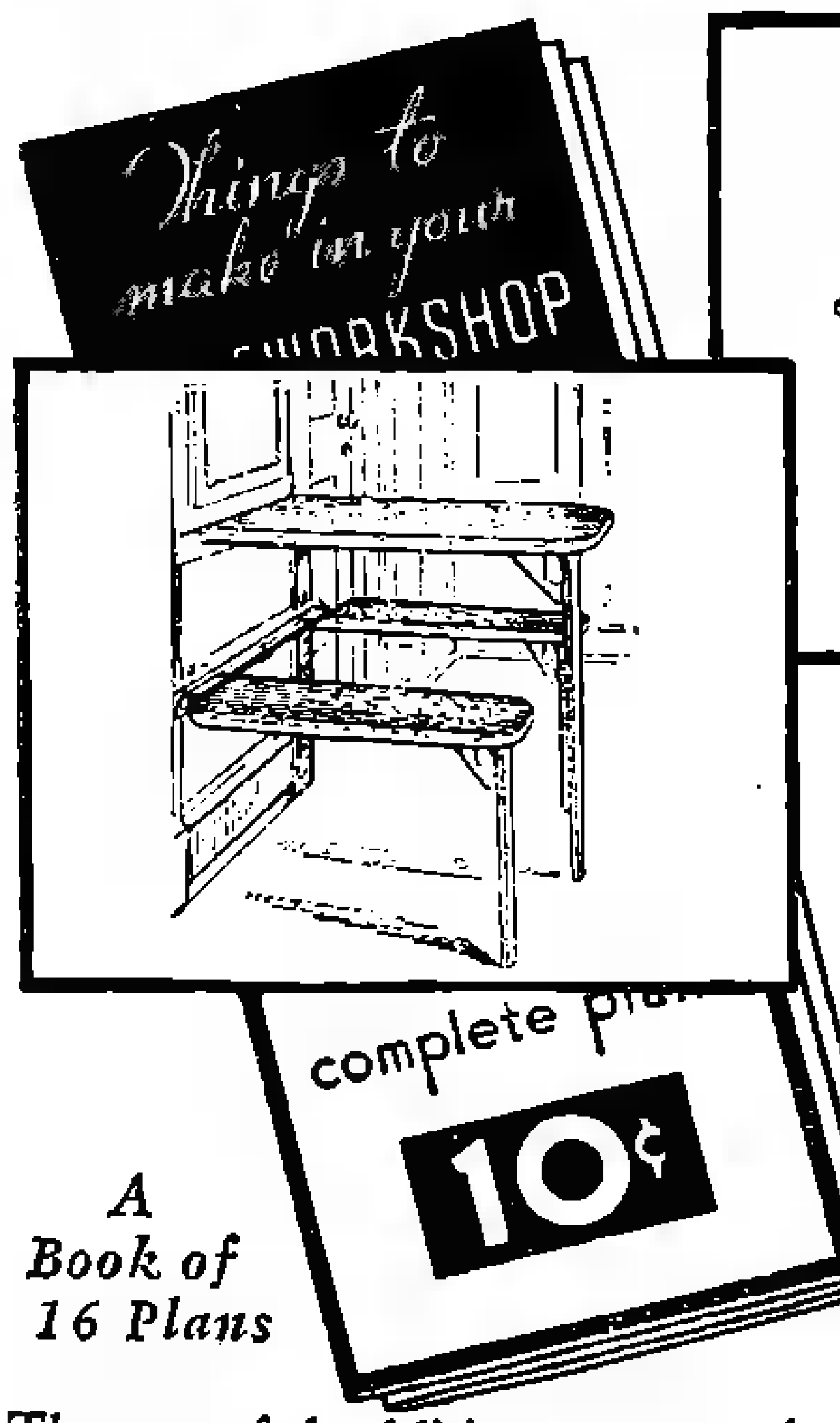
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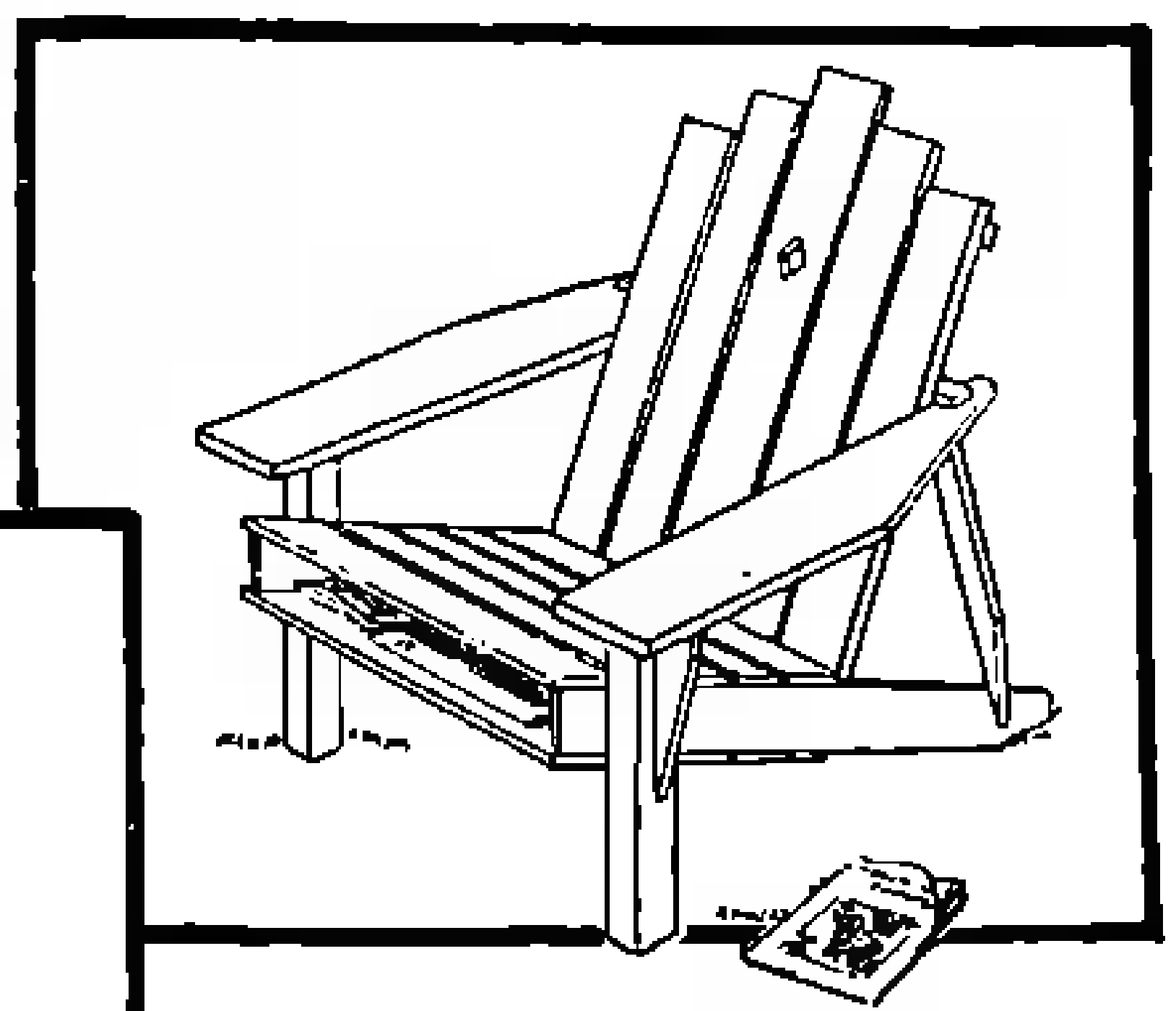

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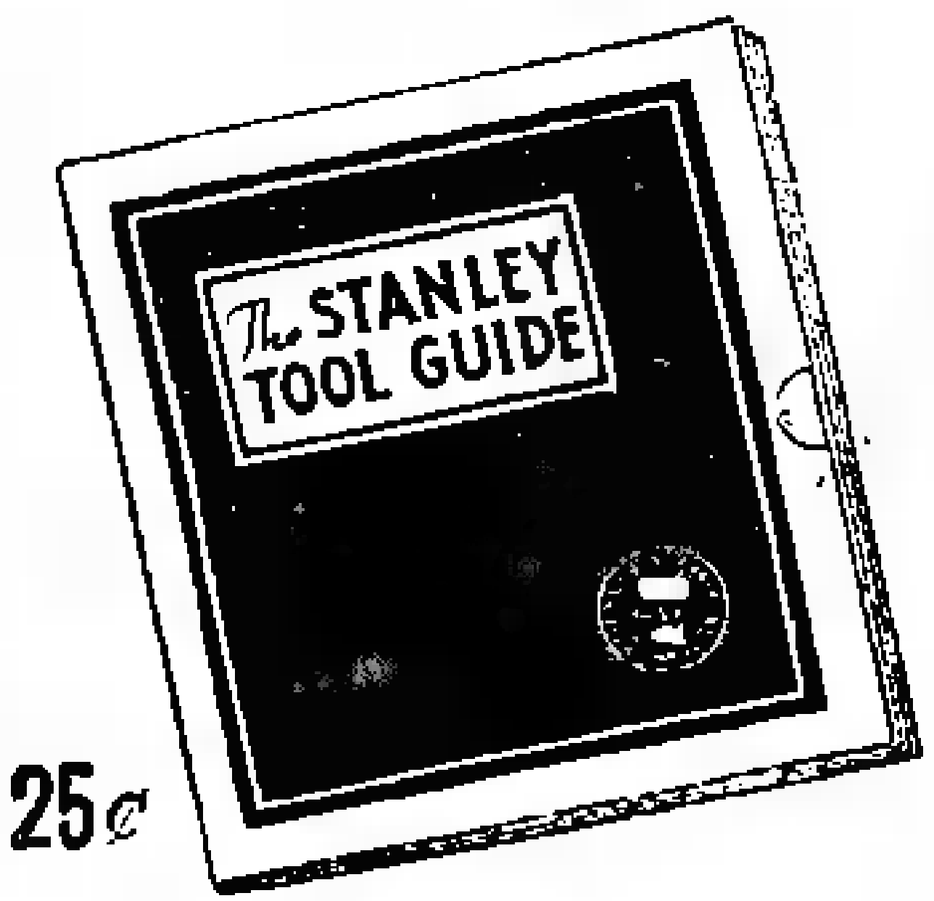

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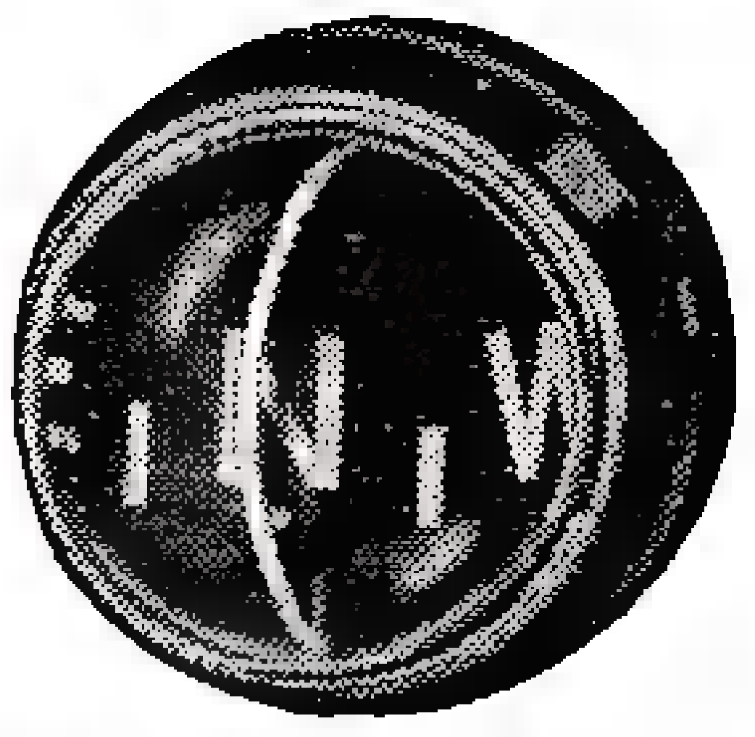

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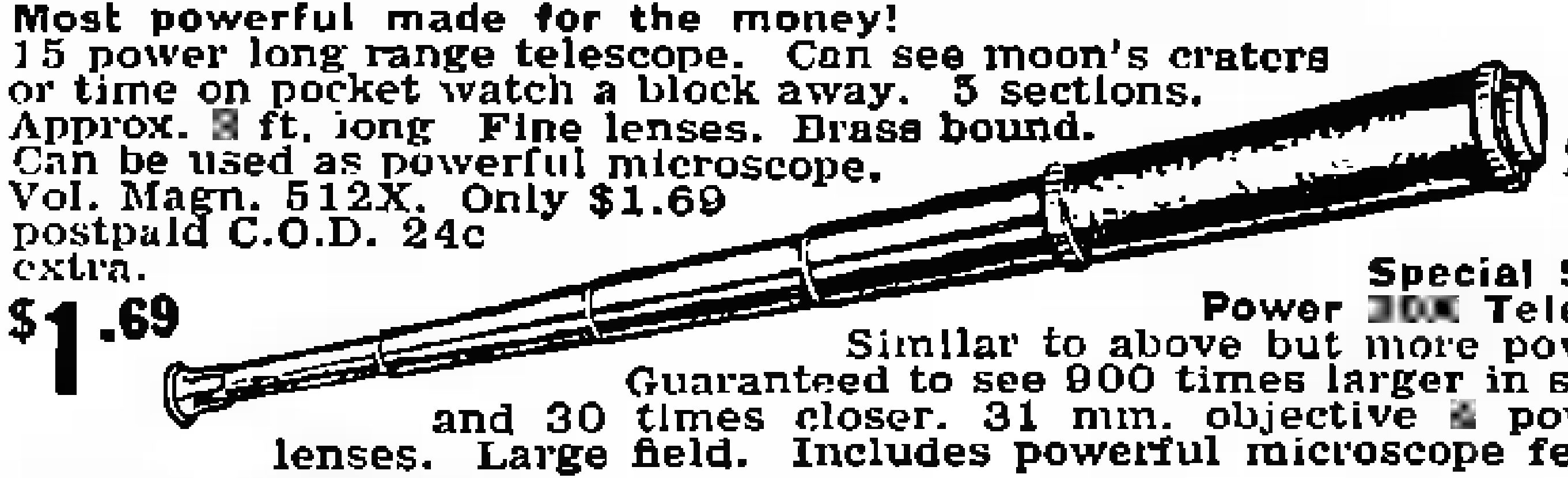

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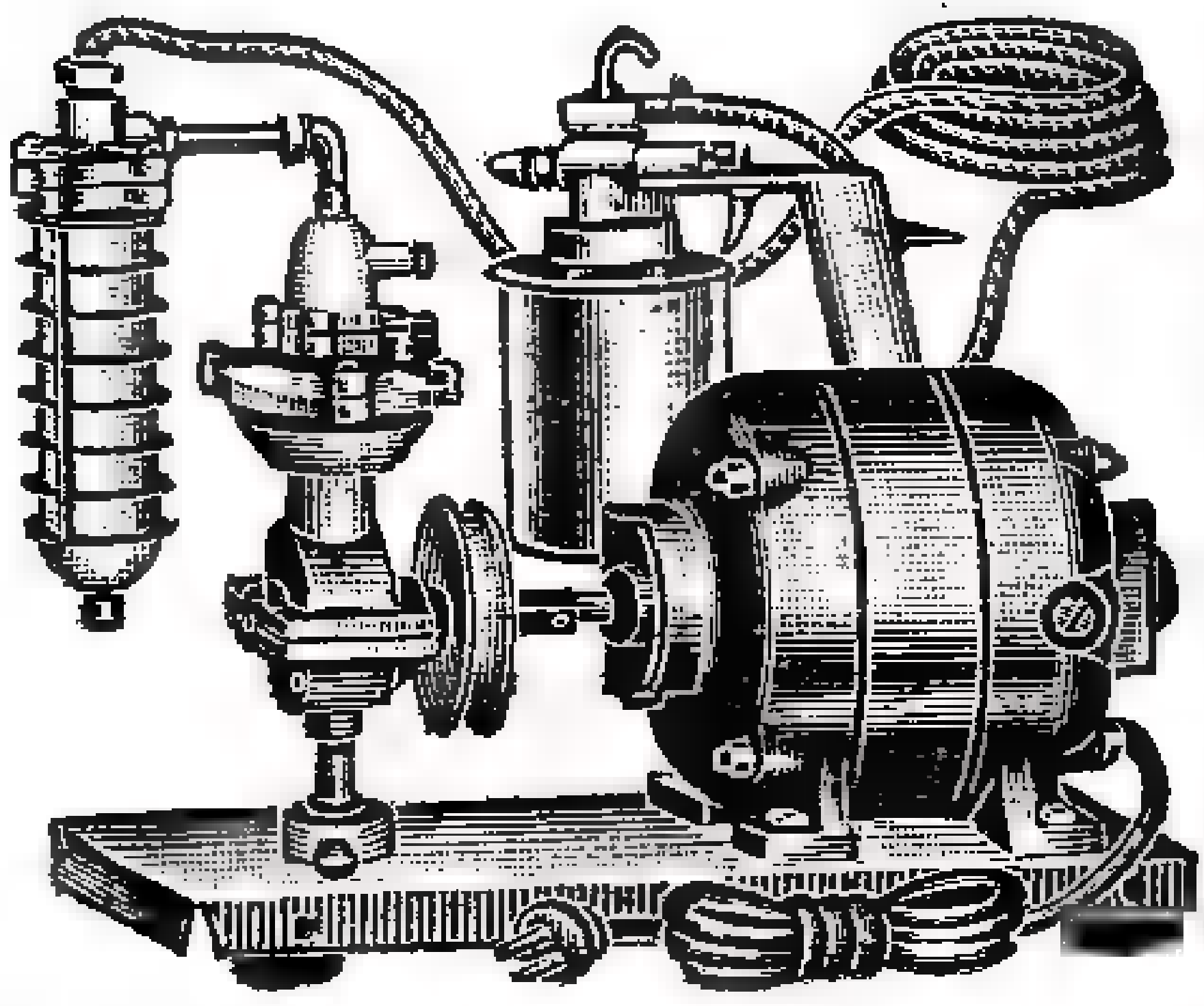

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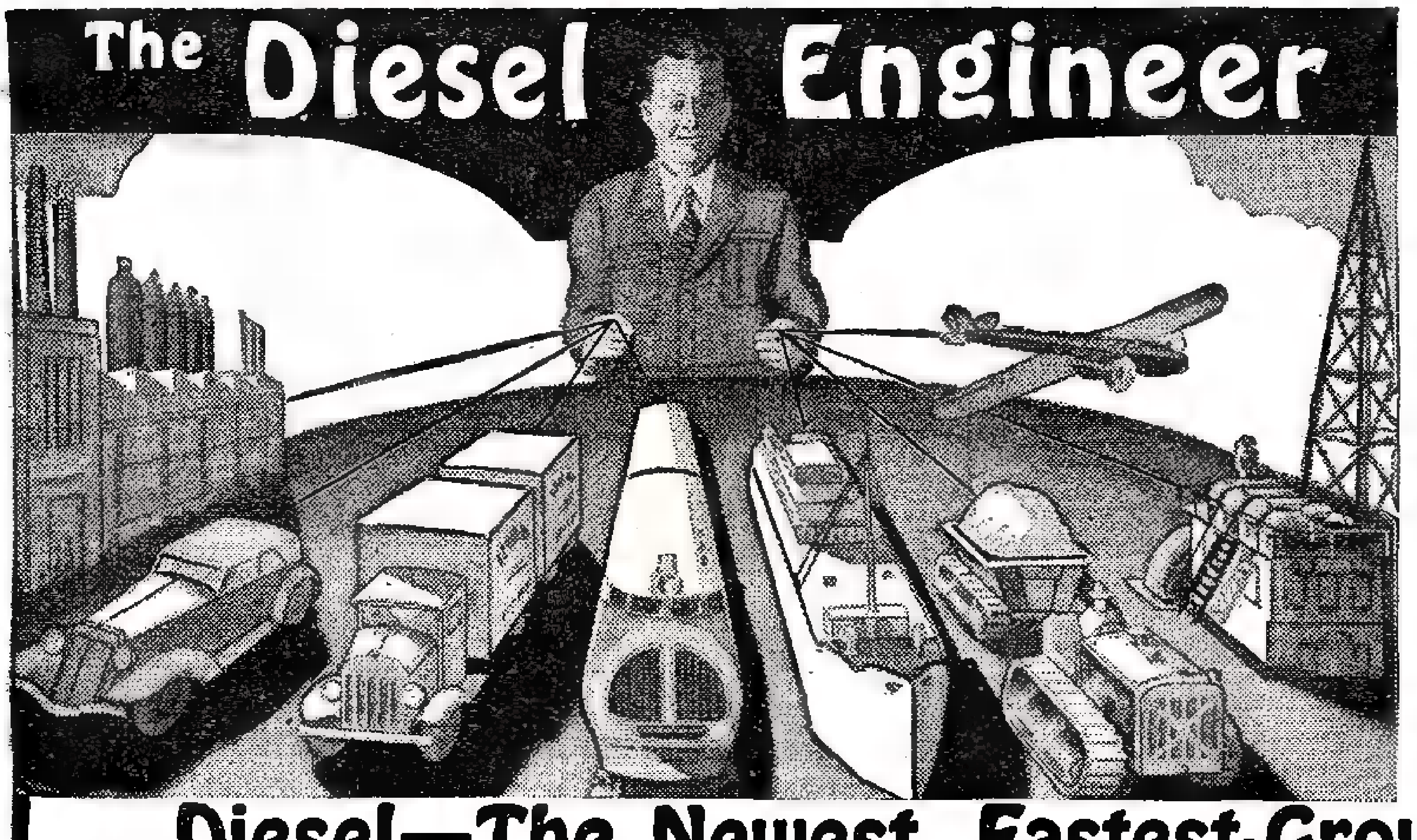

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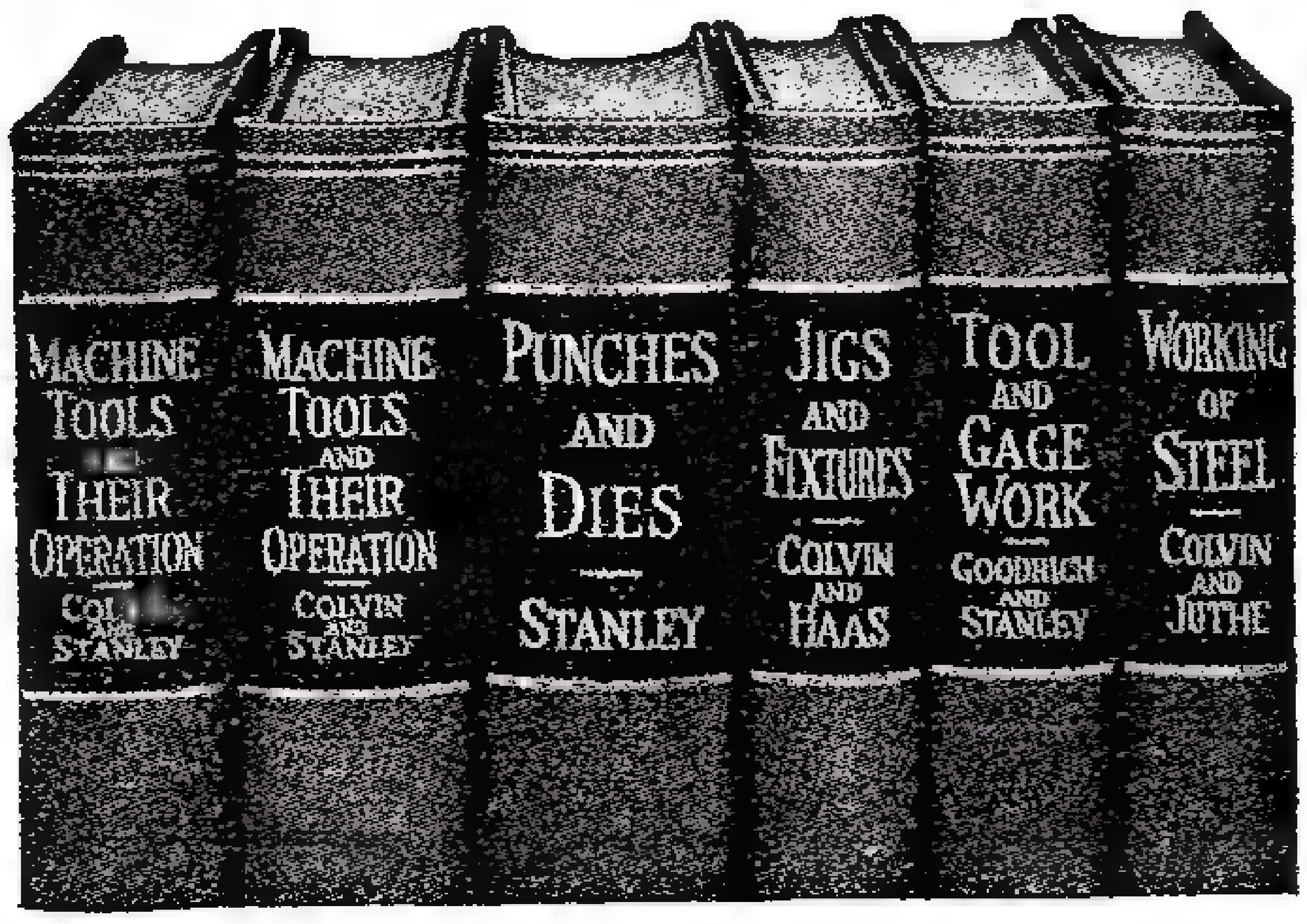
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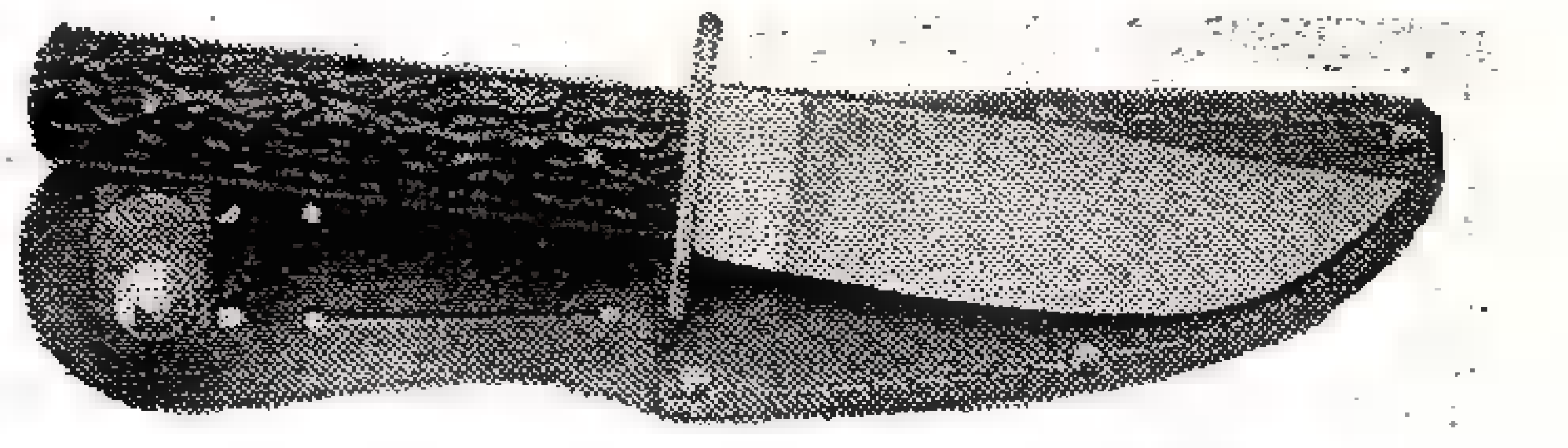

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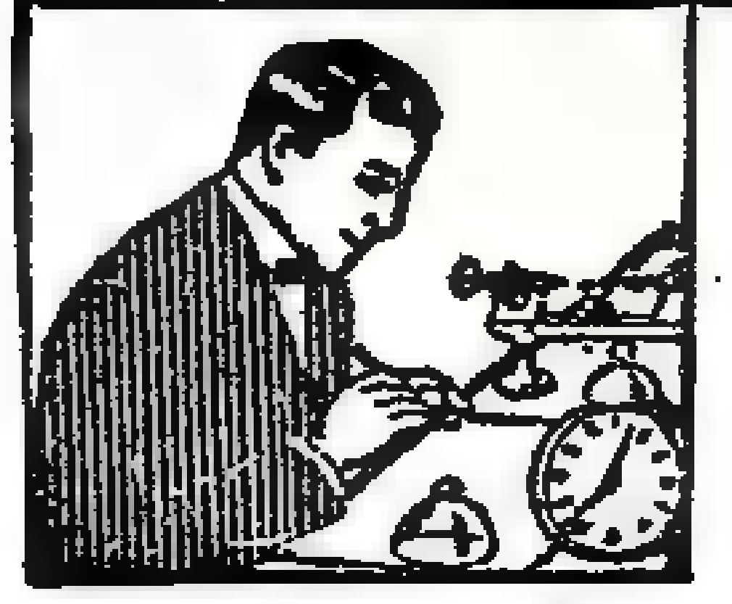

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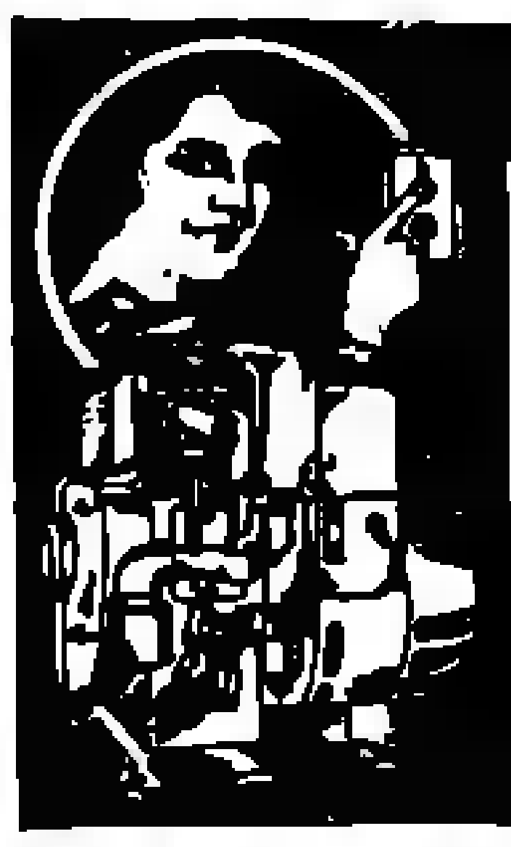

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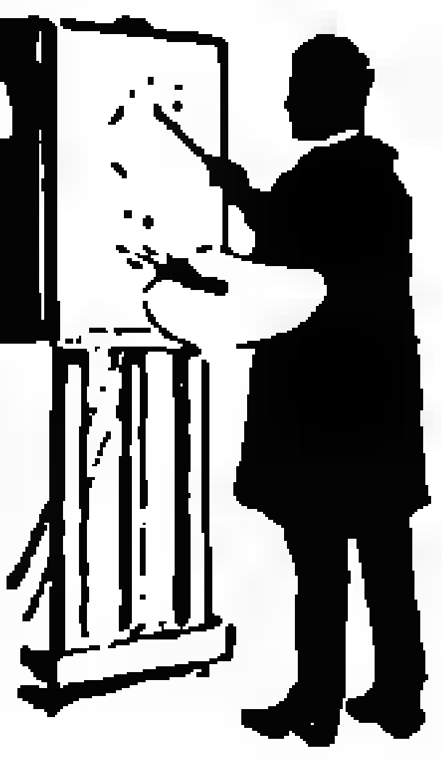

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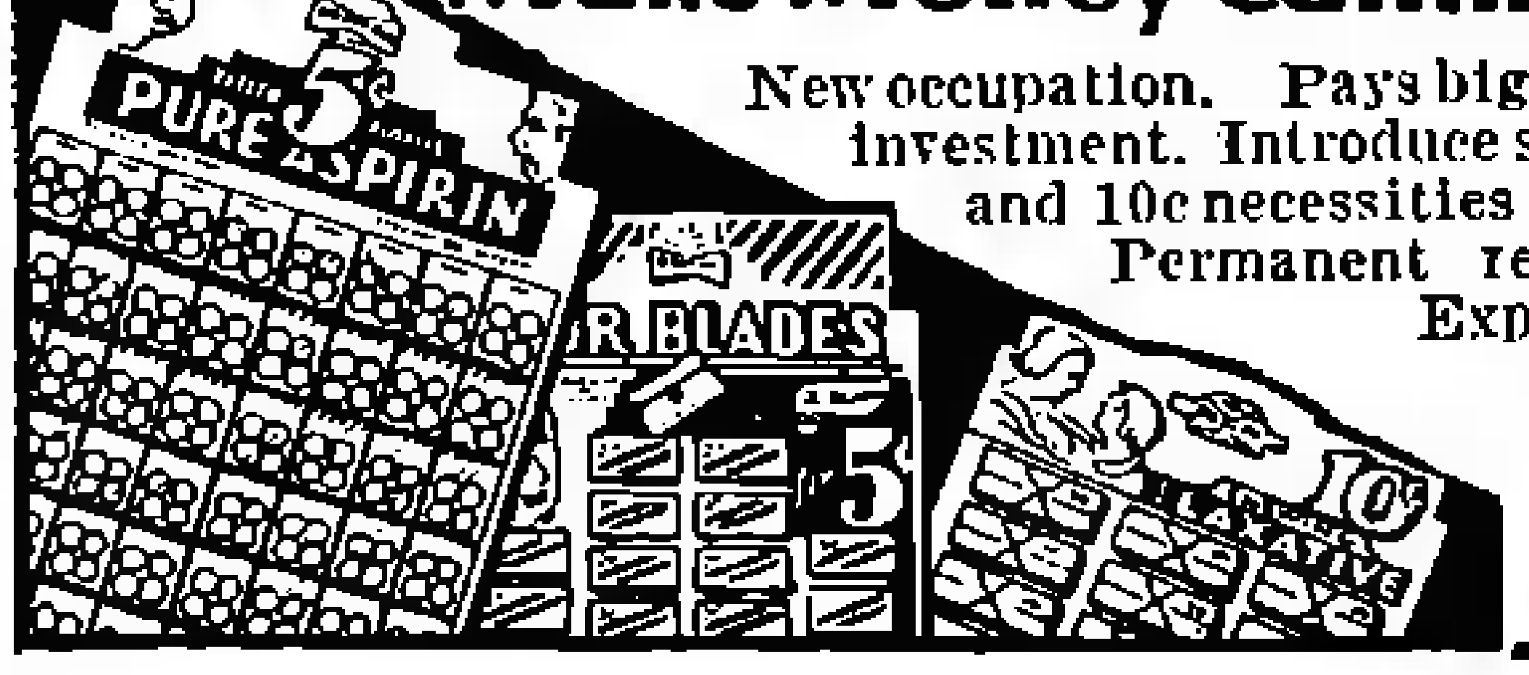

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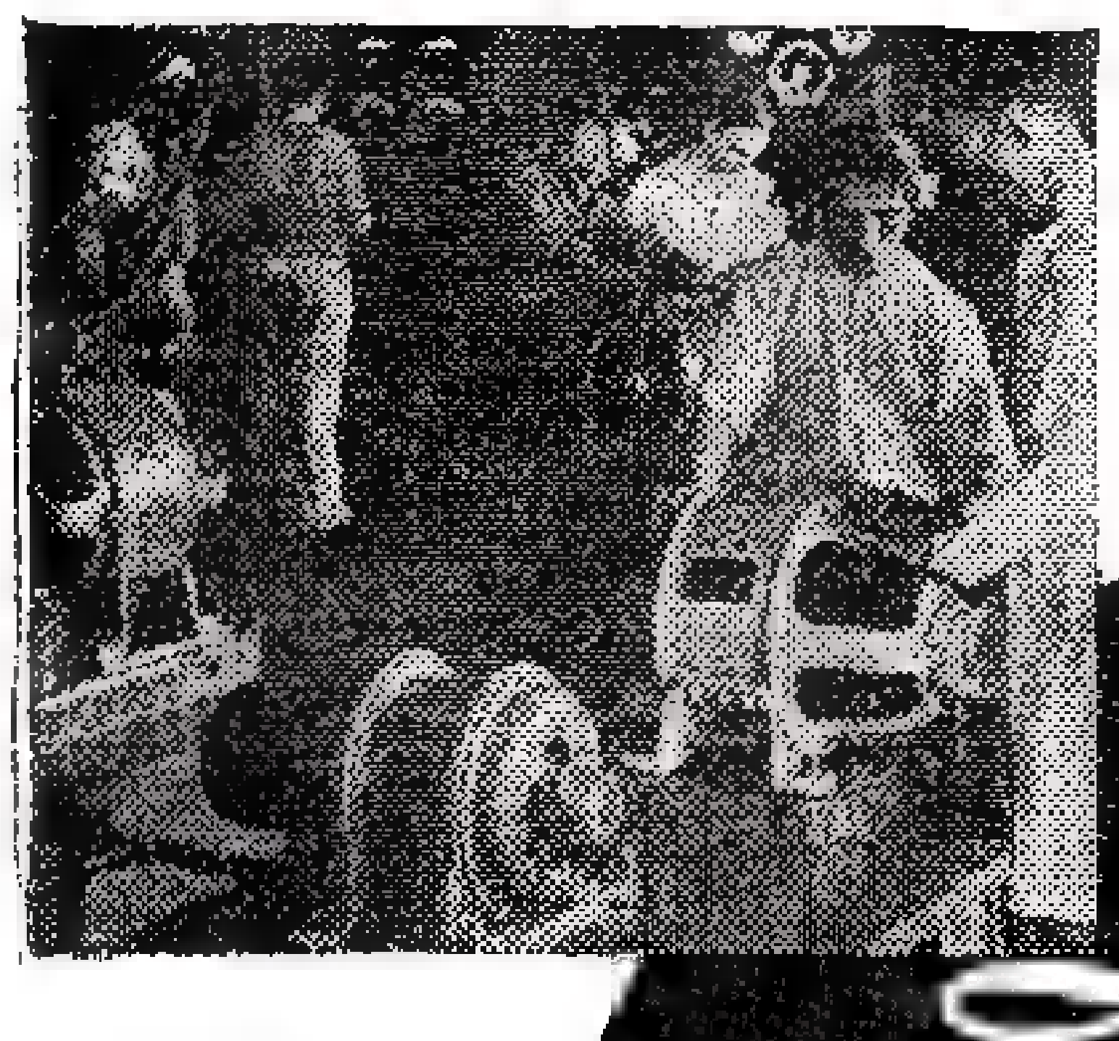

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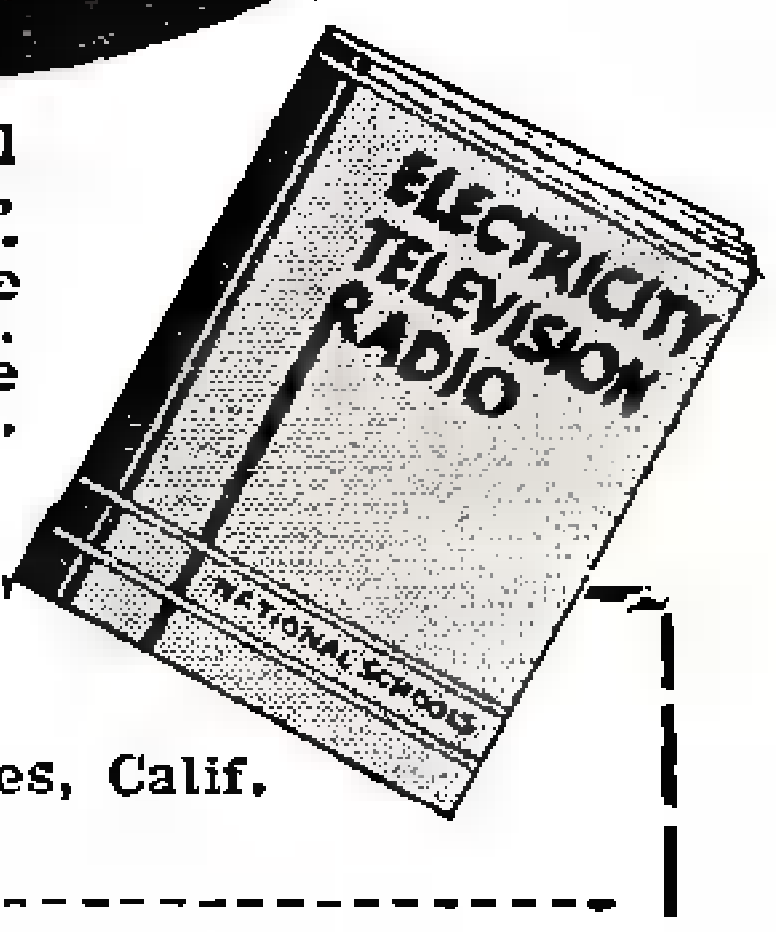

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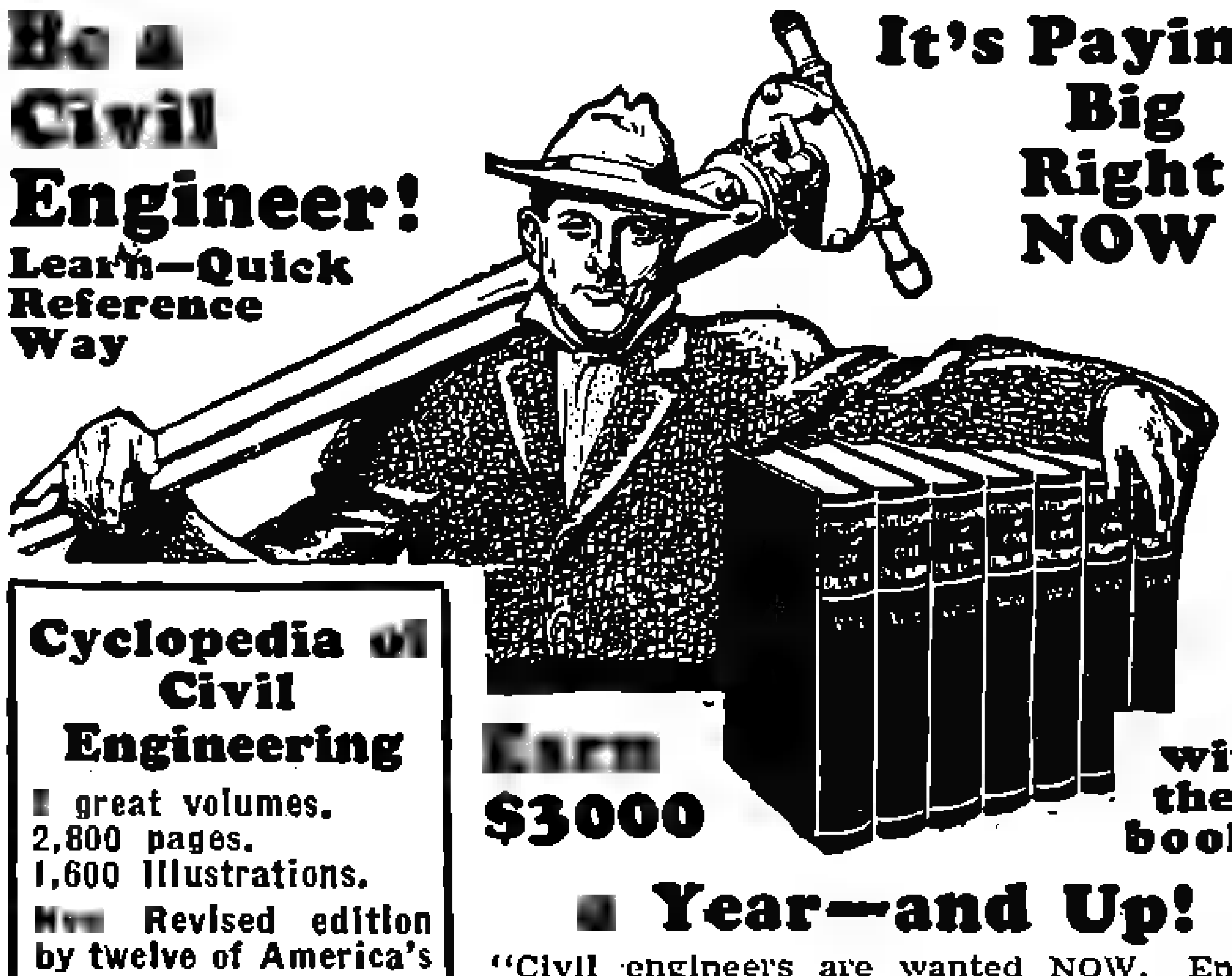

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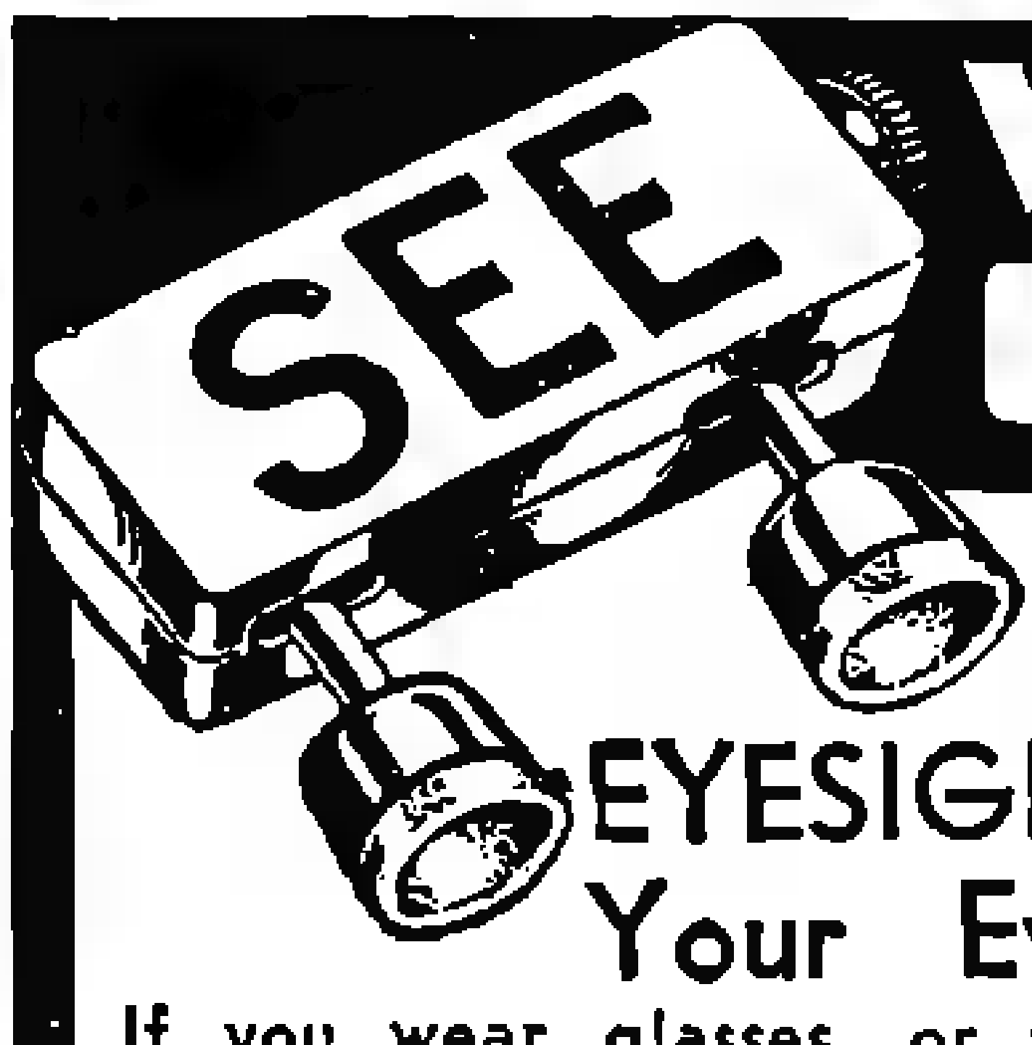

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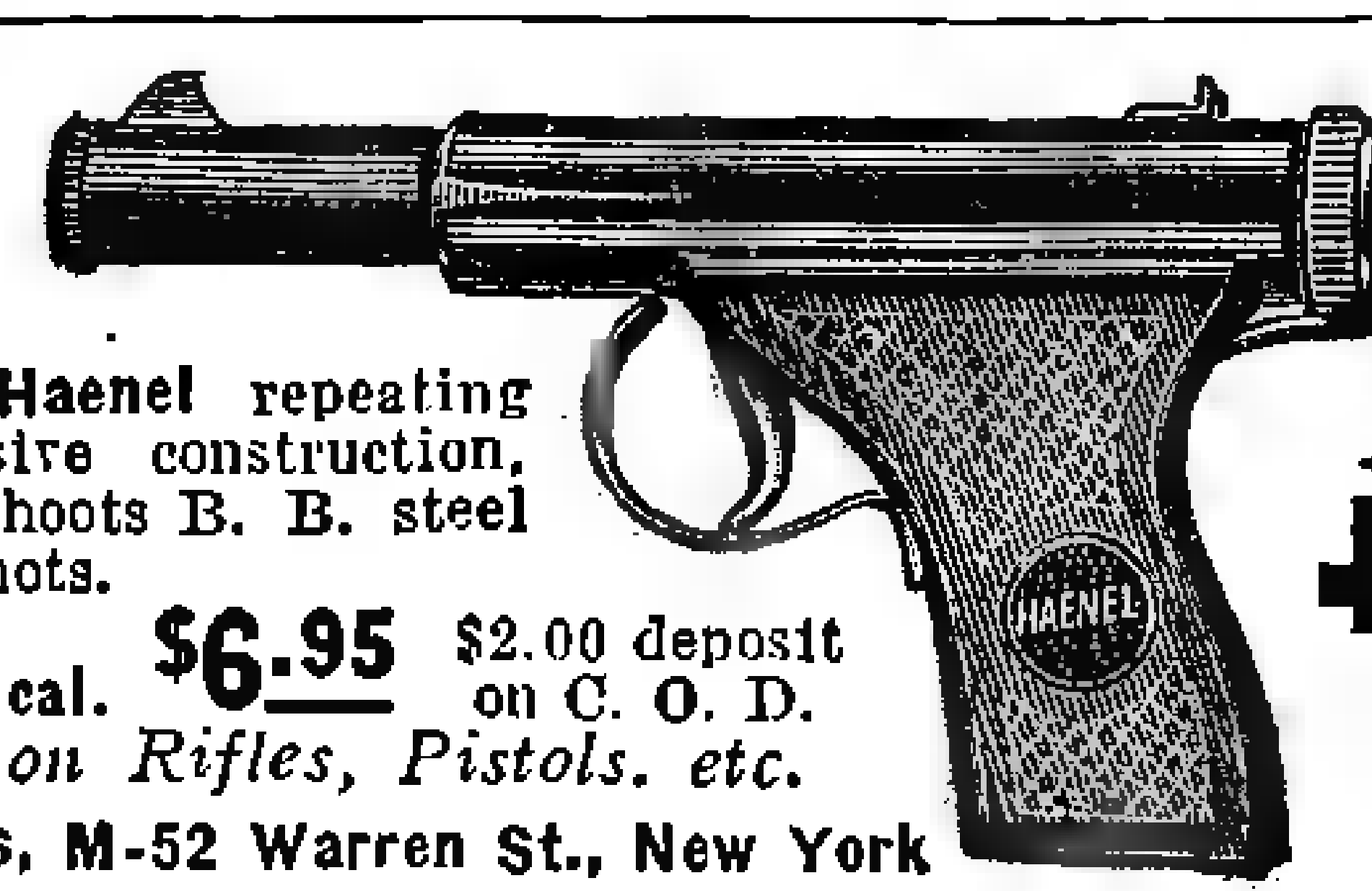

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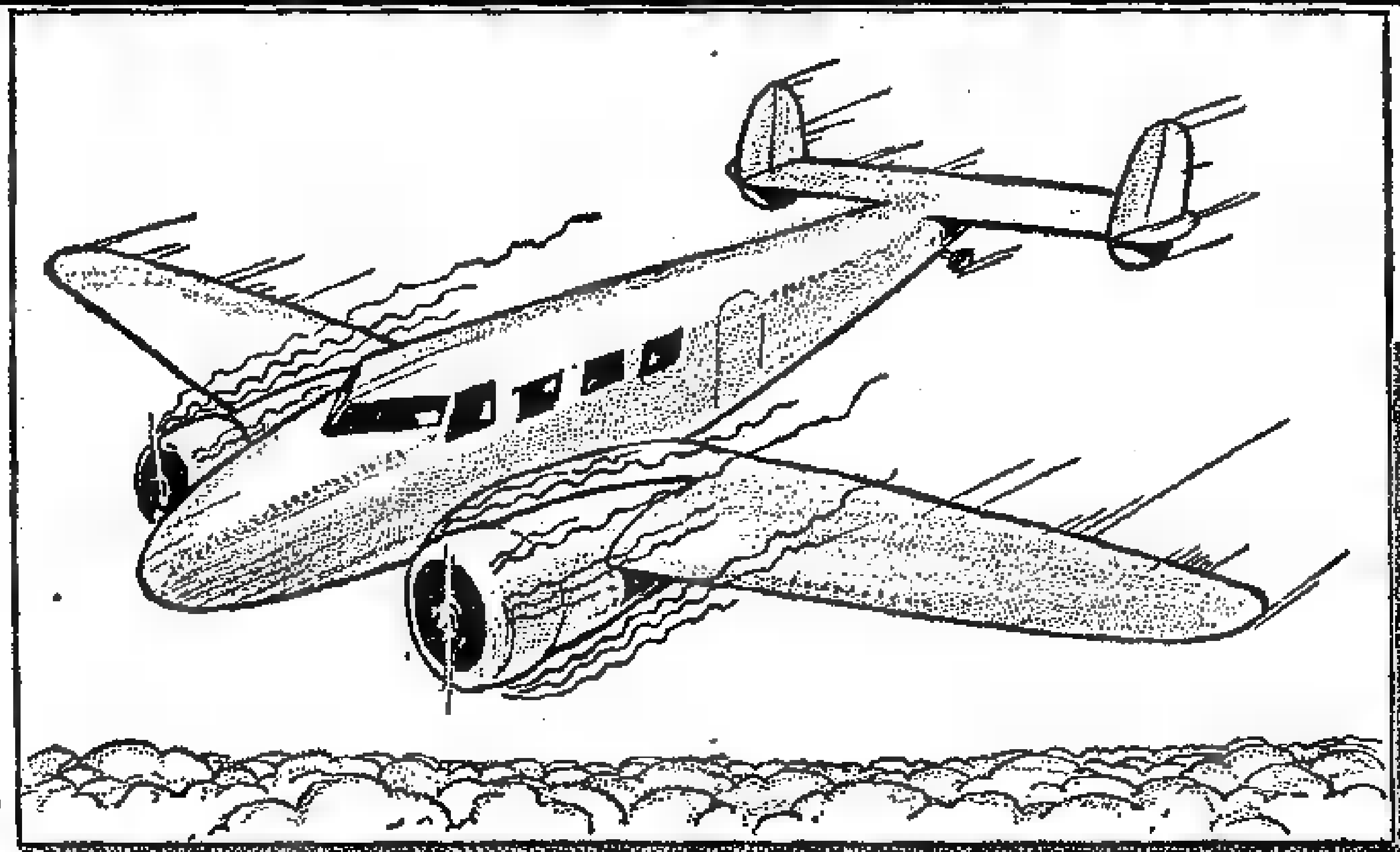

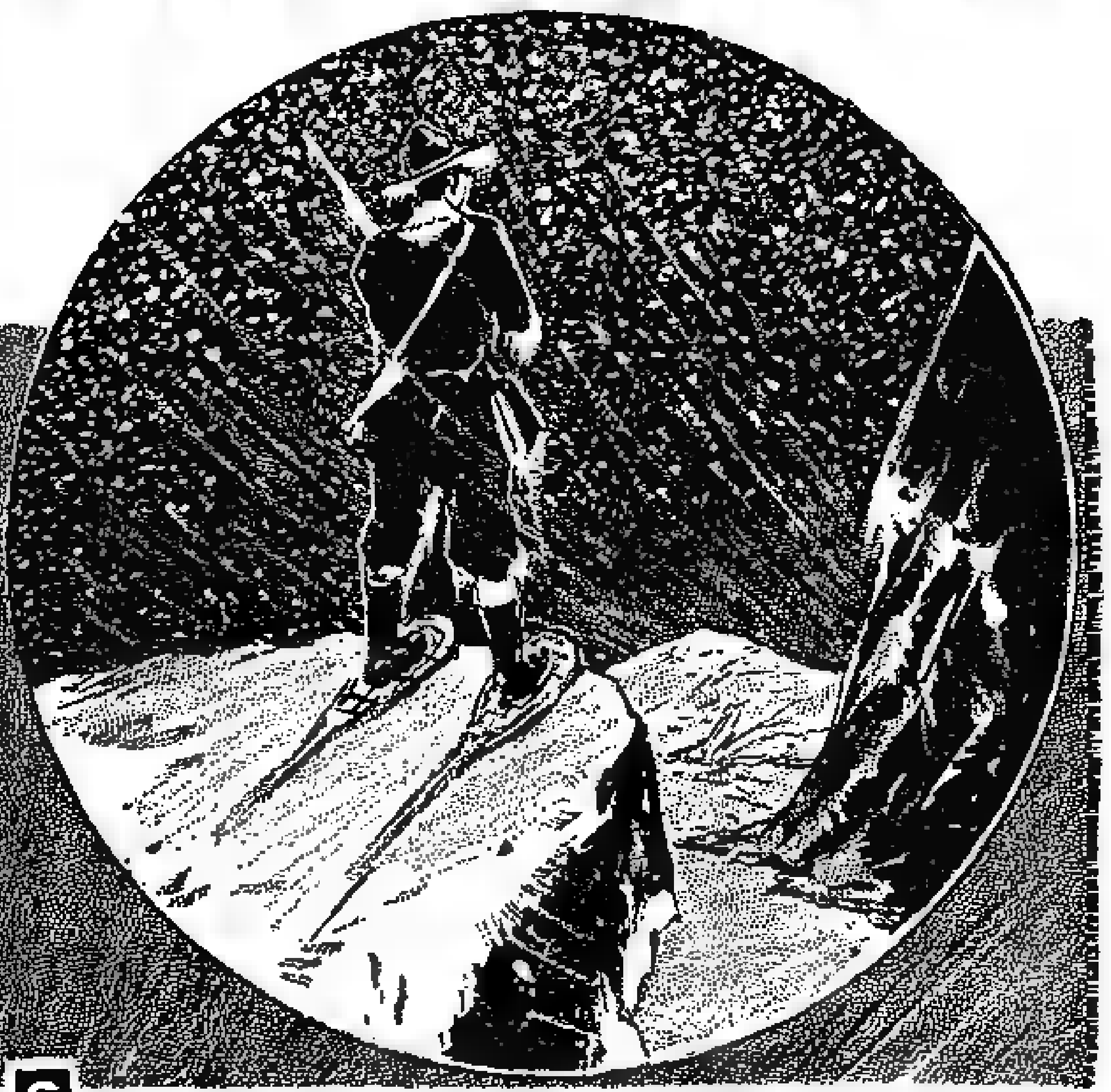

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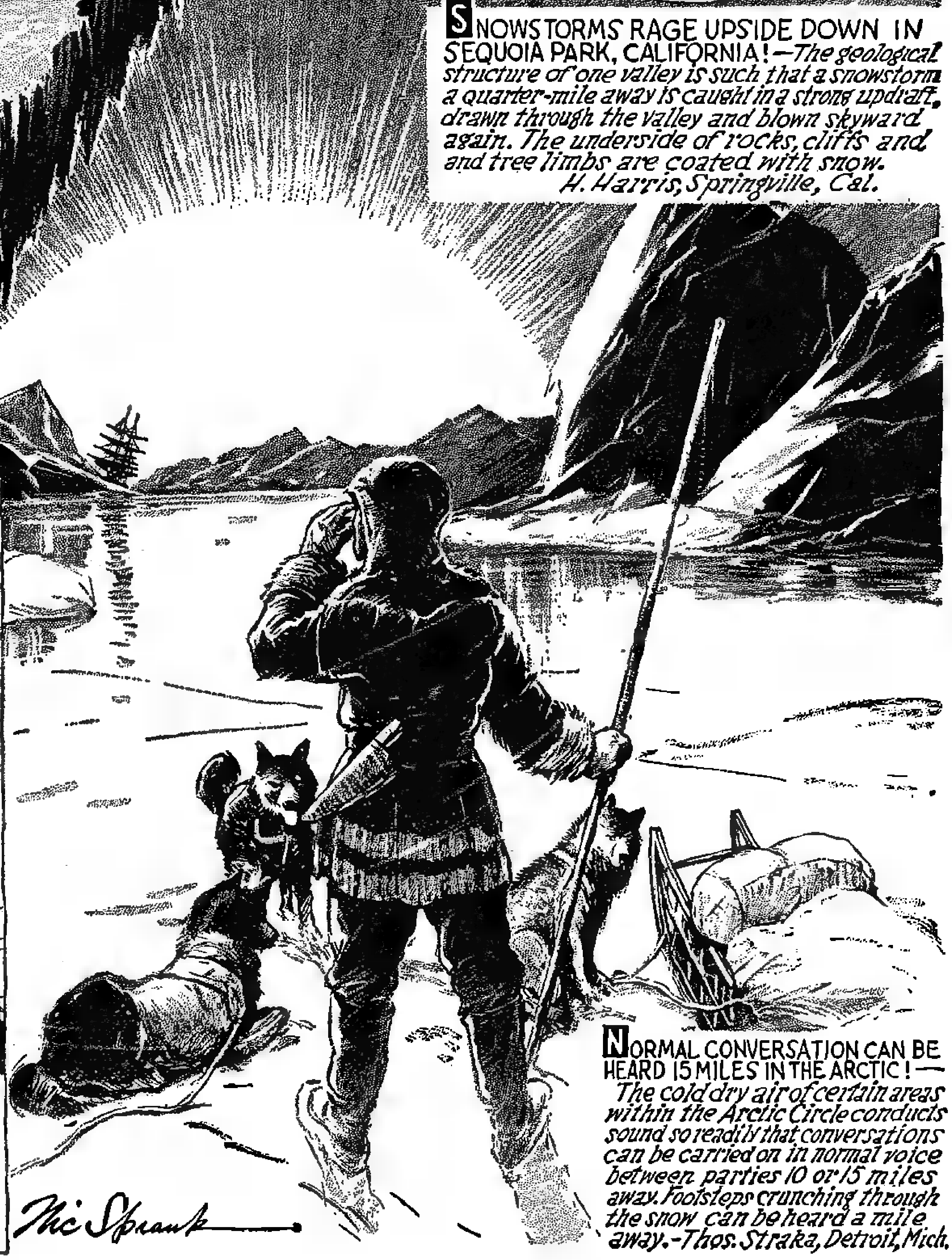

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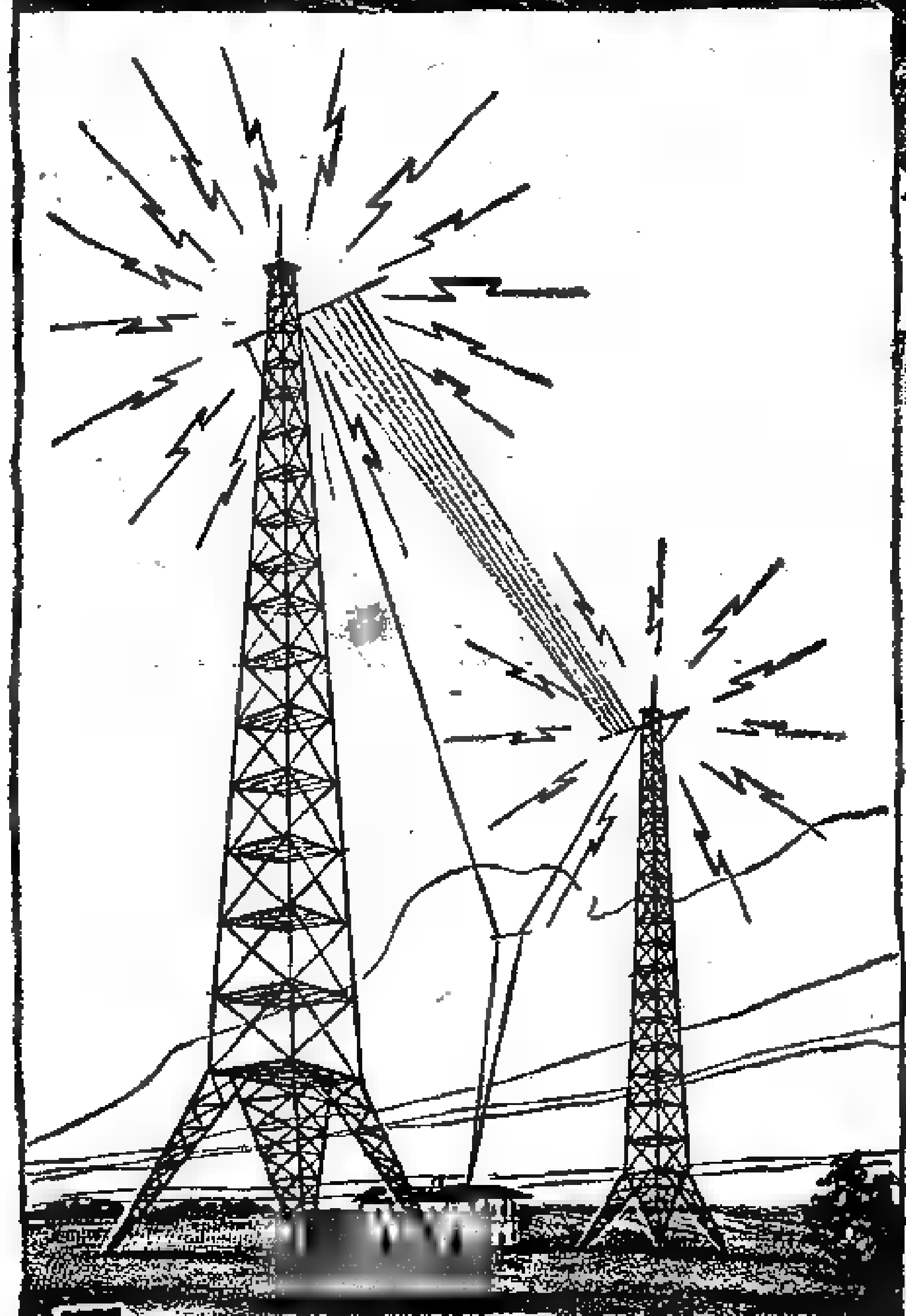

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H. G. Wells *Photographs* *the* FUTURE

in His Motion Picture "THINGS to COME"

H. G. Wells, novelist, historian, and world famous prophetic genius has found in the science of today the roots of a startling civilization. His discoveries are brought to life in a remarkable manner, as told in this article.

by
DONALD G. COOLEY

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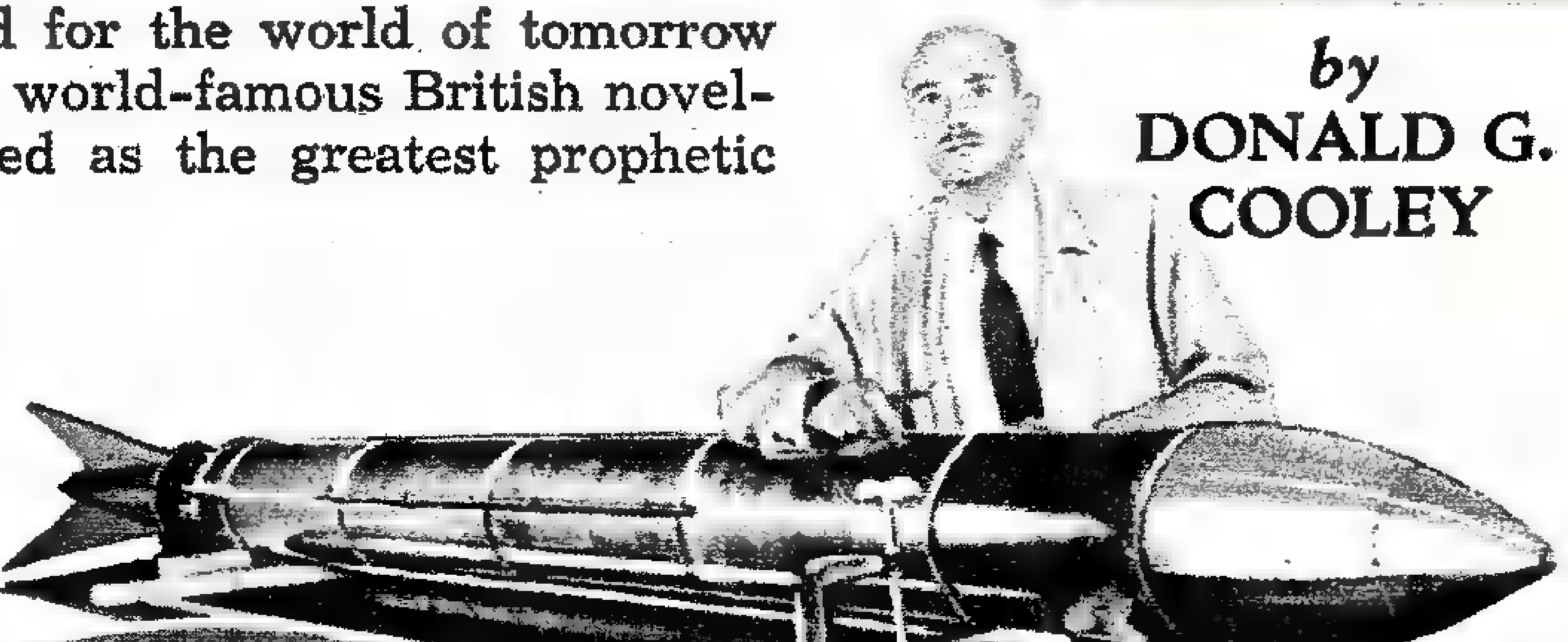
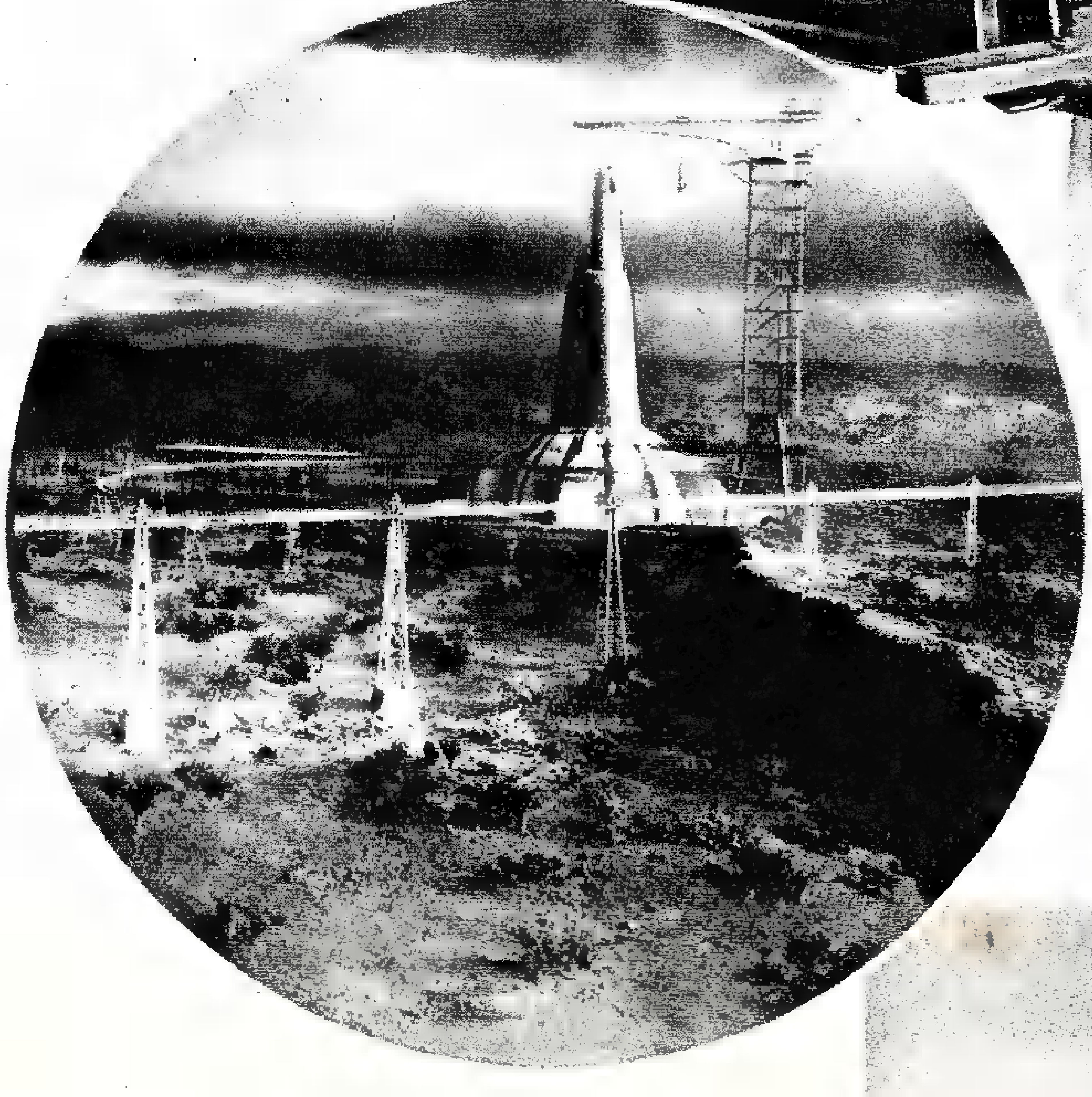
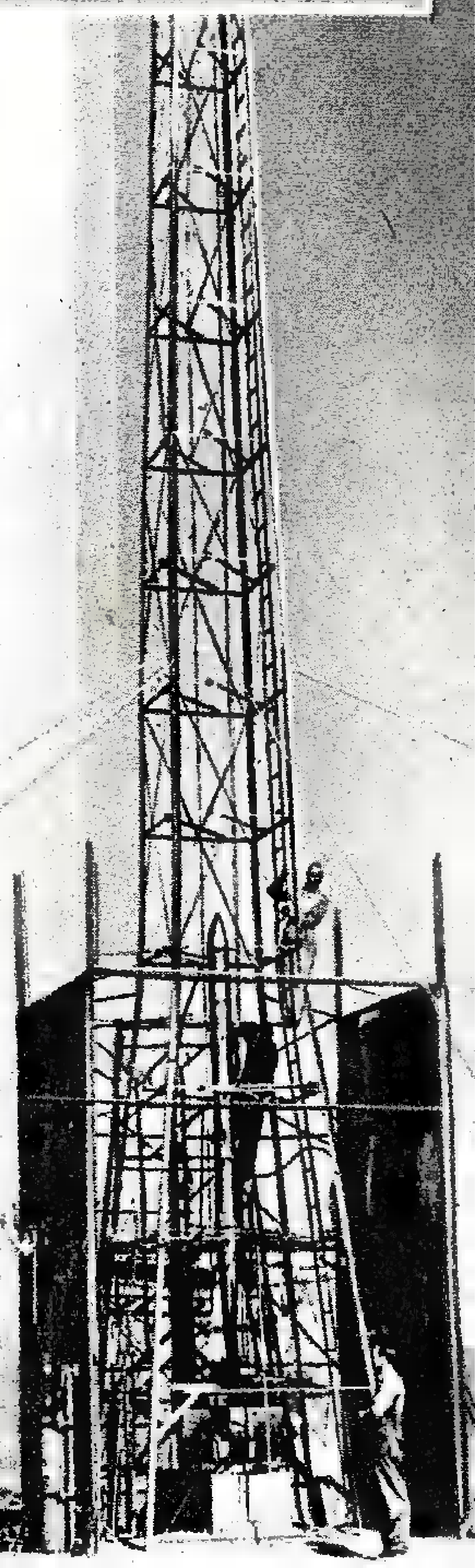
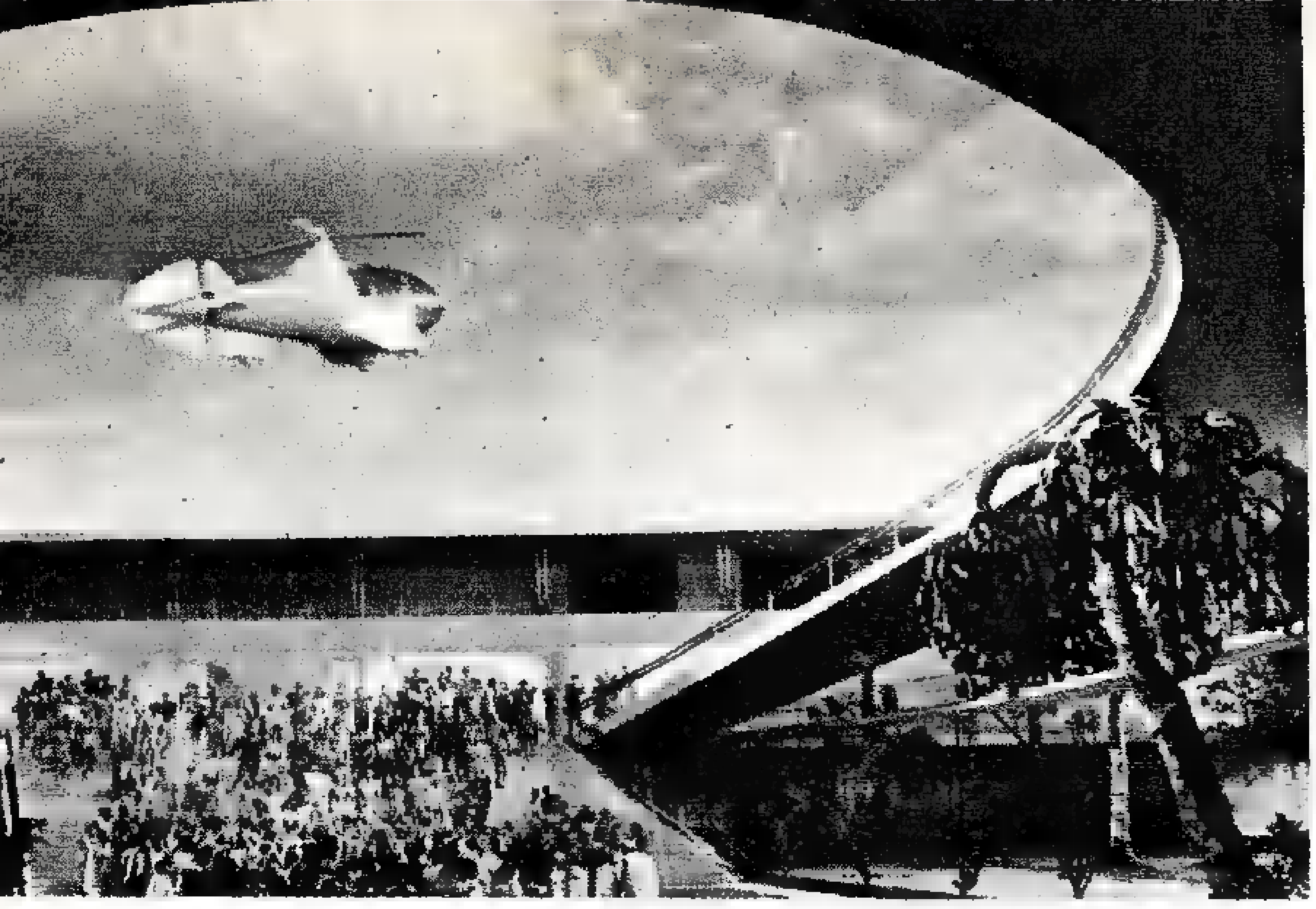


Dr. R. H. Goddard, America's foremost authority on rockets, whose work lays the foundation for H. G. Wells' future space ship.





Right—This rocket tower, built by Dr. Goddard near Roswell, New Mexico, is the forerunner of the giant space gun envisaged by H. G. Wells for launching space ships to the moon. Dr. Goddard, as early as 1918, established mathematical proof that a rocket flight to the moon is possible. Circle — The towering space gun of "Things To Come." The space ship is lowered by crane into the gun and fired according to mathematical formula to the moon.



Airplanes which rise and descend vertically are seen in "Things To Come." Here again Wells limits himself to improving things already proven practical, combining helicopters, auto-gyros and dirigibles in a single unit.

genius of our day. With other miracles of the year 2054, they will soon be seen in Mr. Wells' startling motion picture, prophetically entitled "Things to Come."

Not the least convincing fact about Mr. Wells' vision of the future is the clean-cut way in which he eliminates what he calls scientific "balderdash." Tomorrow's world will be a triumph of science and the machine, to be sure. But there will be no robot men; machines will not rise like Frankensteins to slay their creators.

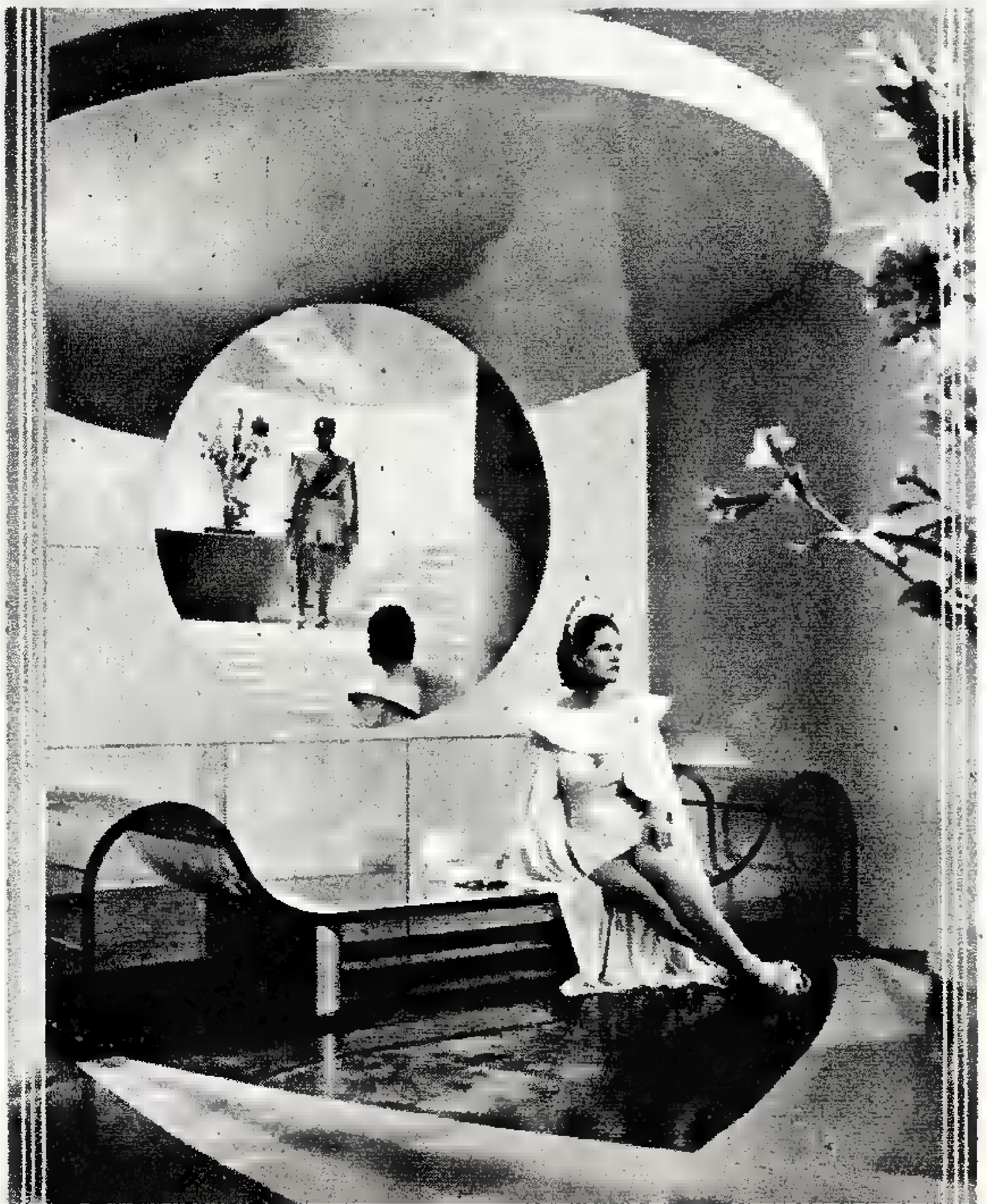
Such fantastic touches as these often adorn the prophecies of less able scientists than H. G. Wells. But in "Things to Come" we have painted for us an astonishing picture in which there is not a single development which does not follow naturally out of laboratory discoveries of our own day. It is inspiring for us folk of 1936 to realize that the progress of science, as presented each month in the pages of MODERN MECHANIX & INVENTIONS, is laying the foundation for a new civilization.

"Things to Come" begins in 1940, only four years away. Without warning, bombing planes appear suddenly over the city of Everytown, symbolic of every other city in the world. It is Christmas Eve. Out of the black night comes the soul-shattering terror of the bombs, rending skyscrapers to kindling, blowing people to atoms. Deadly new gases sweep through the ruined city, choking out the lives of men and women and children, proving that there will be no non-combatants in the next war.

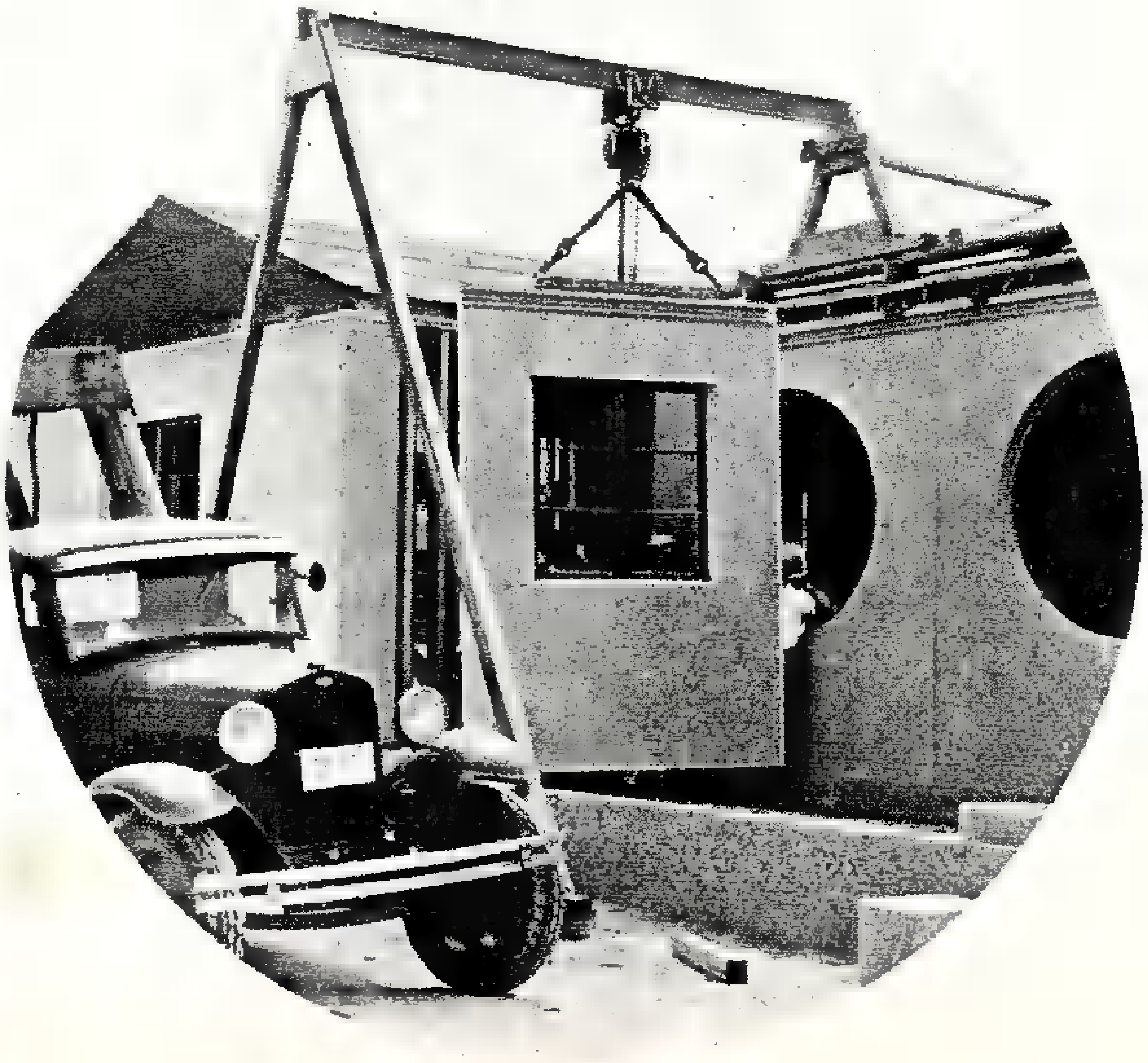
Frightful as the dramatized bombing appears, it is no exaggeration. Since the last aerial bombing on a large scale in 1918, an amazing increase in efficiency has been demonstrated by the fighting planes of the world. The destruction wrought by Zeppelins and bombers during the World War was trivial when contrasted with the tremendous destructive power of modern air forces.

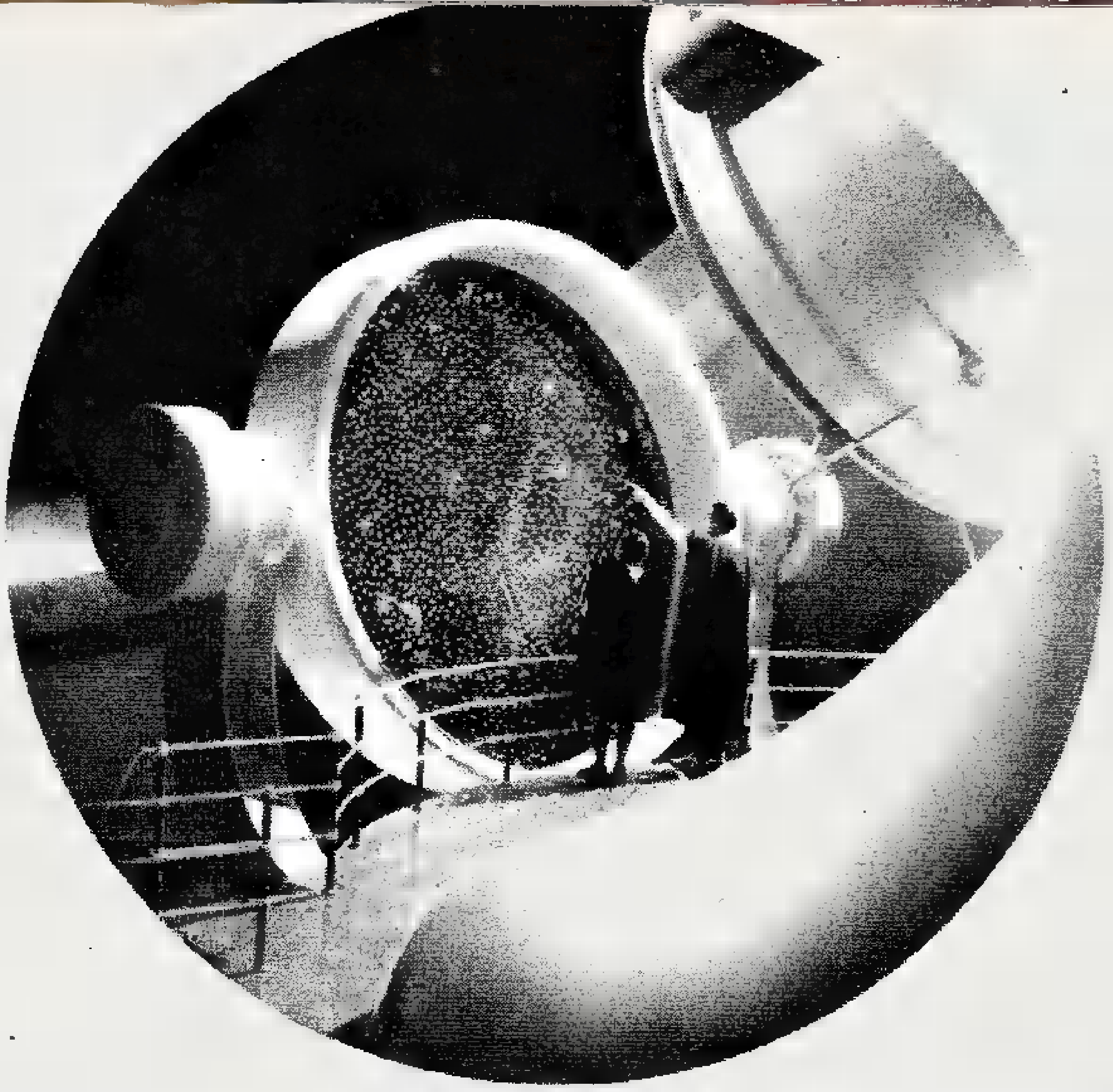
Despite almost complete destruction, Everytown hurls every fiber of its strength against the enemy. Soon there comes a new horror—the shells of the enemy spread the germs of a strange disease, the Wandering Sickness. People stricken by it wander blindly for hours until they die. Water and

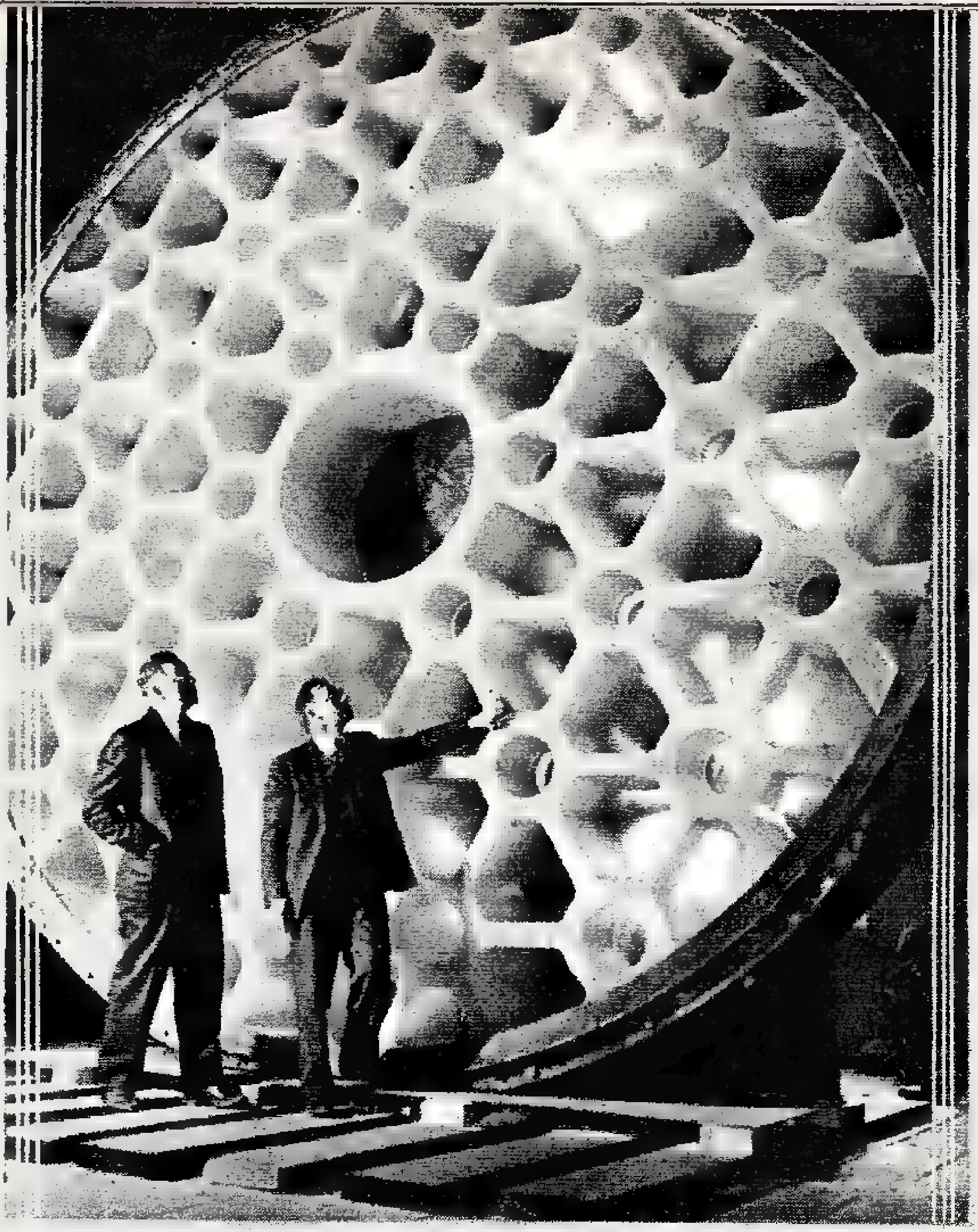
Mastery of Machines Is Key to Man's Survival



Left—This underground apartment in the future city of Everytown was made of chemicals poured into moulds just as prefabricated houses are being built today as shown in circle.







In this telescope at Everytown scientists watch the space ship fly to the moon. The new Mt. Wilson 200-inch telescope at right would be able to follow such flights with ease.

Today's Progress Paves Way to Future Wonders

food supplies are contaminated. Doctors can devise no cure for it, for all laboratories, all means of research have been destroyed.

This weird disease could be similar in form to the invisible plant disease virus which Dr. W. M. Stanley of the Rockefeller Institute for Medical Research succeeded in crystallizing recently. A few crystals of this substance dissolved in the city water supply would leave scarcely a resident alive.

By 1970 the endless warfare has reduced the world to a state of barbarism.

Nations have ceased to exist. In their place are communities like Everytown, dominated by local war-lords fighting with their neighbors. The people of Everytown live under the thumb of The Boss.

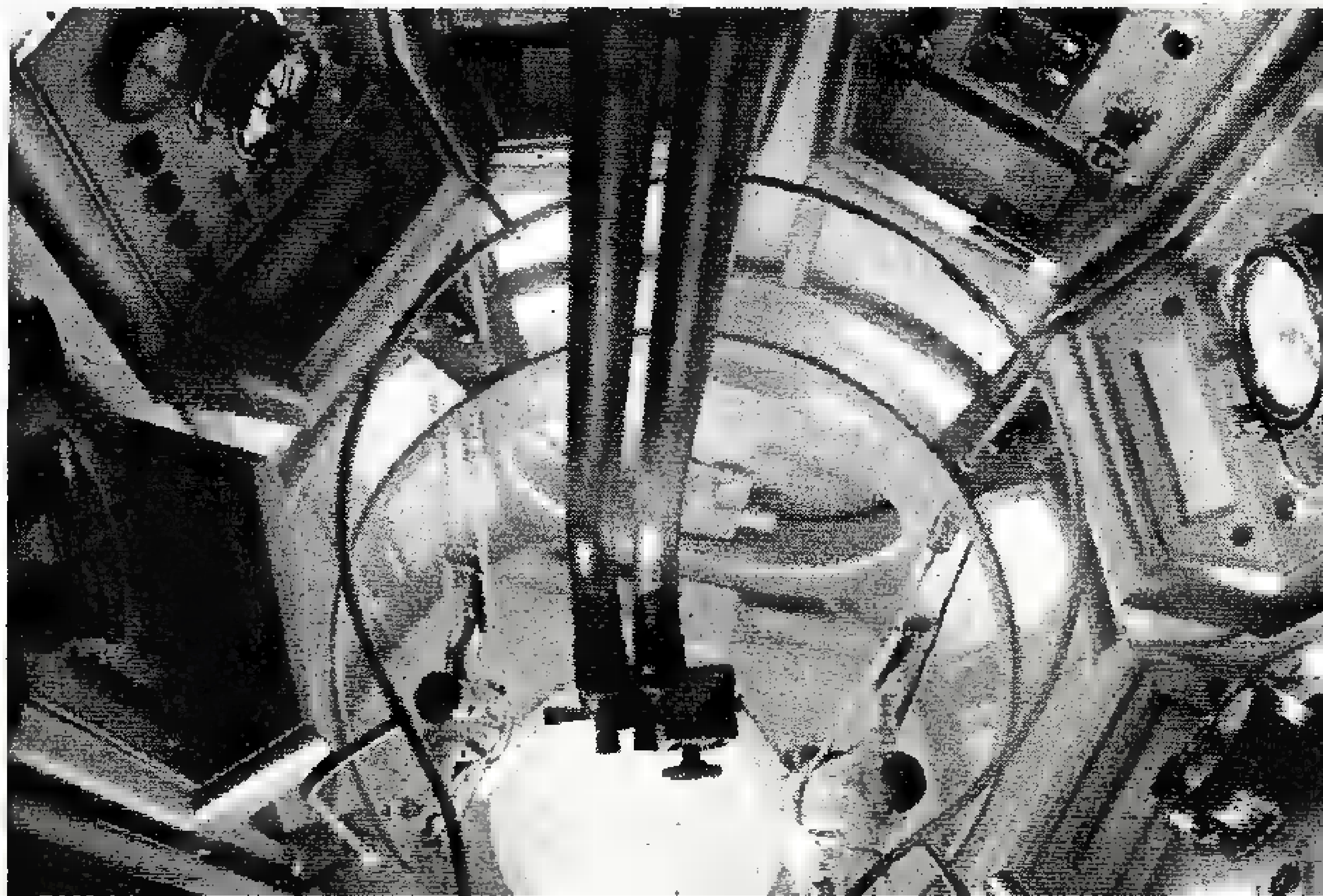
In this desolate scene of havoc a miracle occurs one day. A strange airplane with queer, swallow-like wings descends in Everytown. The pilot is John Cabal, an aviator who lived in Everytown before the war.

The Boss eagerly demands to know if he can buy planes and gasoline to fight to a "victorious peace," but Cabal shakes his head. His government helps no one to wage war. The Boss angrily orders him thrown into a cell, where, some hours later, Richard Gordon finds him. Gordon is an old friend of Cabal's, and with the latter's directions Gordon gets gasoline from Cabal's plane, patches an old ship and manages to escape to Basra.

The throb of powerful motors heralds Gordon's return with a squadron of bombing planes. The Boss is terrified, but he has a hostage! He ties Cabal in the middle of the square where the invaders must see him. In spite of this, the bombs begin to fall. They thud to earth and burst with harmless "plops," but nothing seems to happen. Then, slowly, the Boss and his soldiers and all the citizens of Everytown fall asleep. For the bombs of the airmen are not designed to kill. They release the gas of Peace, a powerful anesthetic.

Thus, in 1970, the soldiers of science begin to build the world anew. And what a world!

We see it next in 2054. An age of enormous mechanical and industrial energy has followed world peace. Flying over the new

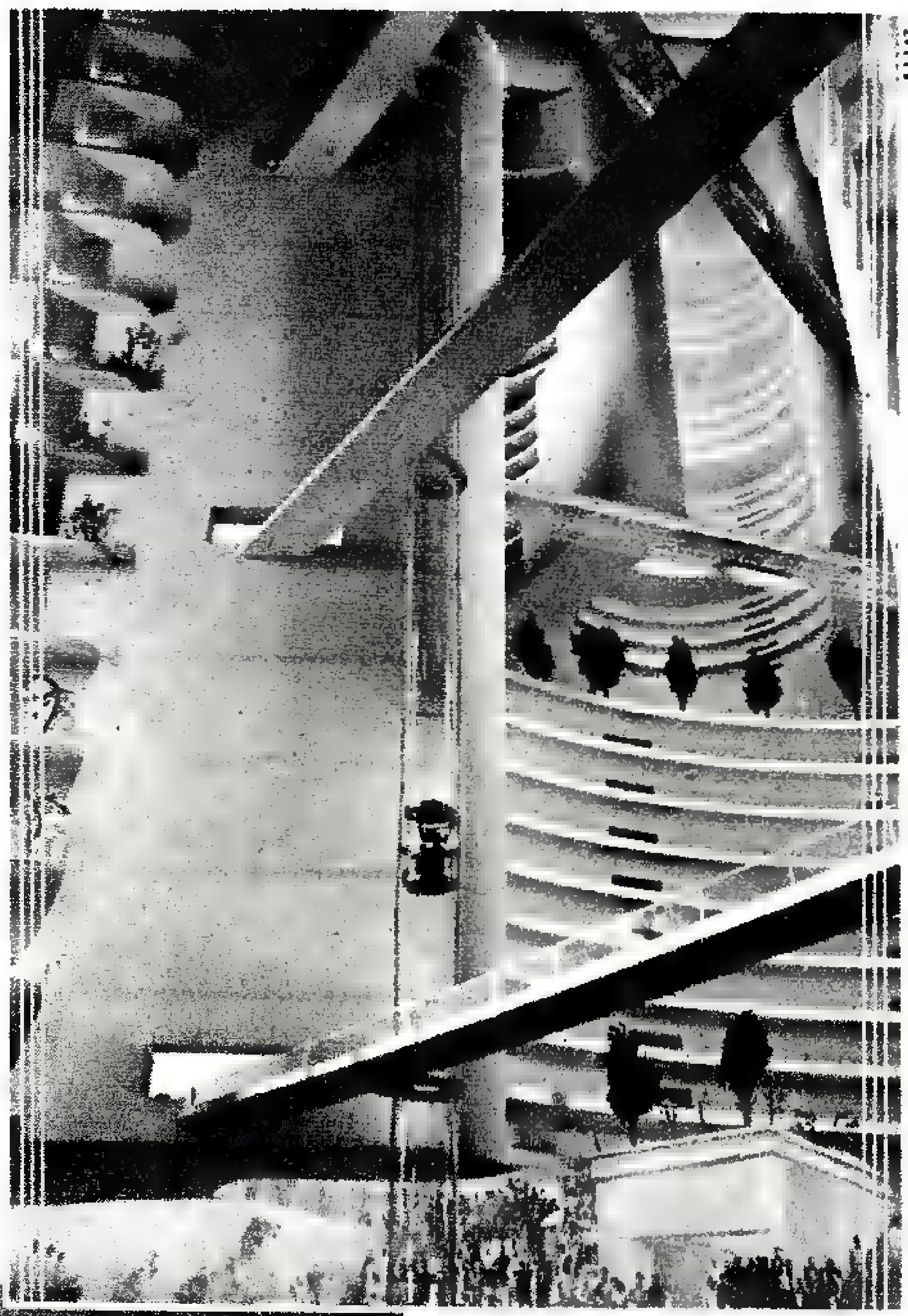


An interior view of the space ship, looking down upon the two passengers who are to journey to the moon. Note the manner in which they are suspended to absorb the first shock.

Science Must Go On—Wells' Theme In Film

Everytown, one might be completely unaware of its existence. There are no skyscrapers; they have vanished with the decadent age of steel. The new Everytown is *dug into the hills*! It is constructed not of metal and rivets, but by chemistry. Liquids bubbling in giant retorts and are poured into moulding machines. They emerge as great slabs, perfectly insulated, immensely strong, which are welded together into walls. Cities are built out of test tubes; the carpenter, bricklayer, and steelworker have long been relegated to the discard.

Already manufacturers of prefabricated houses in our world are accomplishing feats comparable to this, and architects and builders are expecting even more radical changes within the next year or so. The ceiling of the room curves over us gently; it seems as limitless as the canopy of the sky.

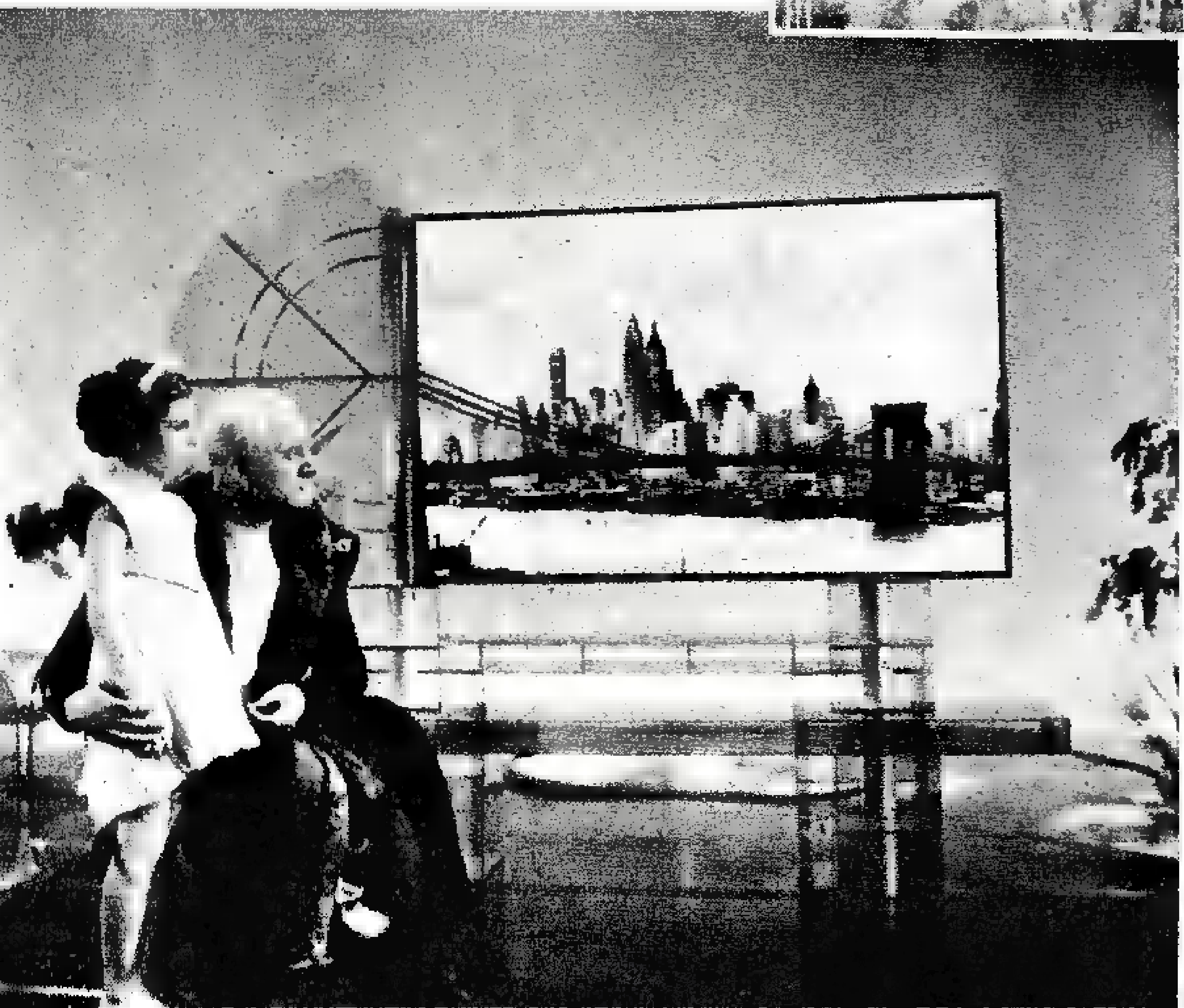


While flowers and trees growing underground without soil or sunlight as shown on the set at left may seem fantastic, modern science is already doing even more fantastic things with plants. Above is shown a plant which has been subjected to a new chemical which causes roots to sprout on the stems or leaves.

Standing in this room in the heart of the subterranean city, we can see miles and miles of landscape in the world outside. We see clouds where the ceiling should be. Rippling lakes, flower gardens, waving trees move majestically across the walls, giving a three-dimensional effect of vast distance. Mr. Wells lets us in on a secret. It is a moving frieze which is projected on the walls. It makes the tiniest room seem as vast as all outdoors.

Many motion picture theaters of today employ this medium for making their auditoriums seem larger. In place of a ceiling they have what appears to be a blue sky filled with stars and drifting clouds of light. As yet, however, the infinite possibilities of this type of mural decoration have been scarcely touched upon.

In "Things To Come" history lessons will be taught by television as shown below. New York is shown as a city of tall buildings full of windows because air conditioning and artificial lighting had not been perfected when the buildings were erected. Today, however, air conditioning and lighting has advanced almost to the point that has been predicted by Wells.



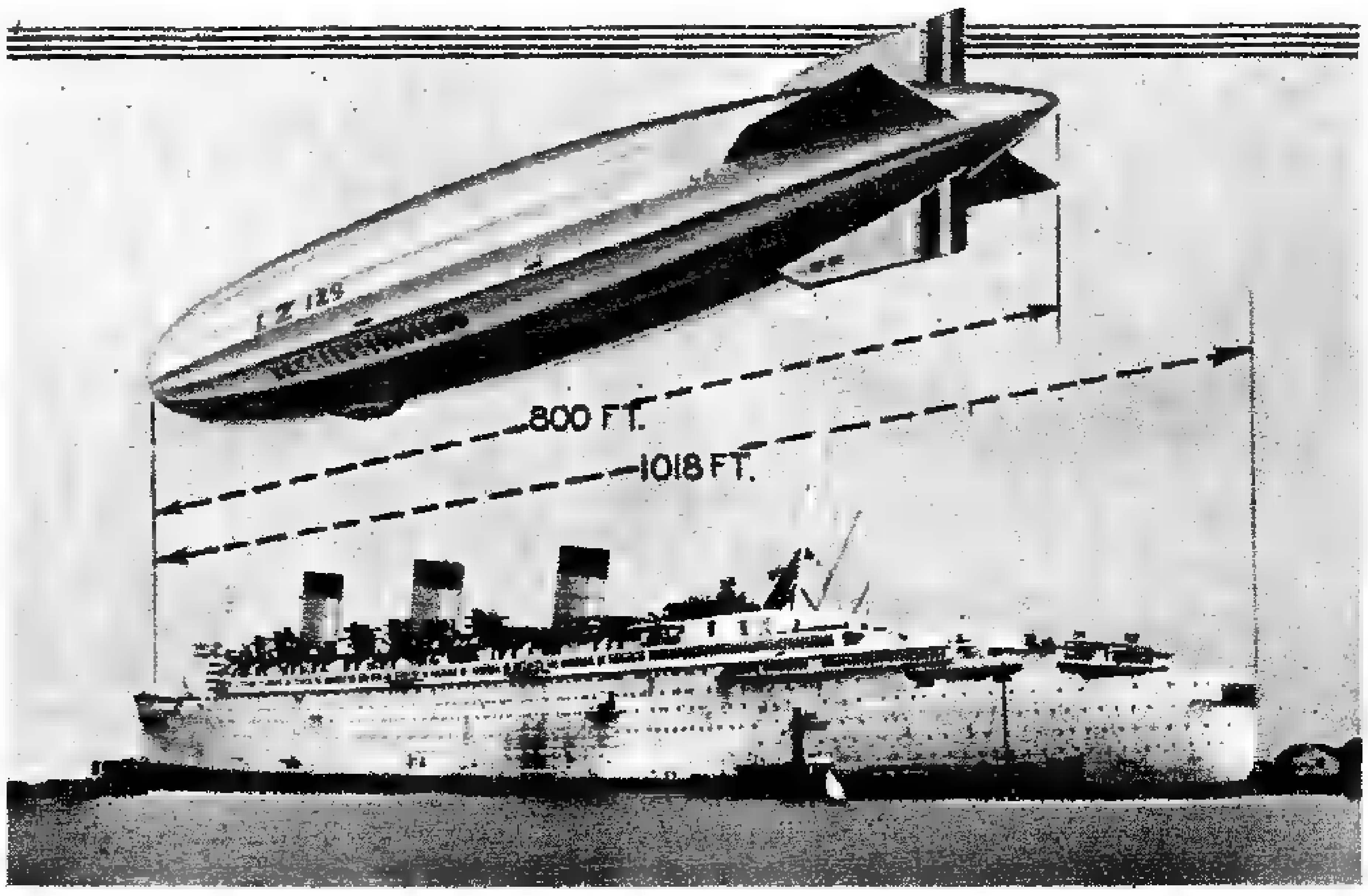
Weird Flowers Adorn Everytown

All furniture is made entirely of glass and metal. Flowers are growing in glass vases about the room. They are like no flowers ever seen before—strange, gorgeously beautiful new blossoms, the creations of botanists.

[*Continued on page* 127]

Giants of Sea and Air Vie for Transatlantic Honors

SOON to make their bids for the Atlantic travel trade are the new German Zeppelin LZ-129, already completed at Friedrichshafen, and the liner Queen Mary, nearing completion at Clydebank, England. Both crafts feature luxuries duplicated only in the finest hotels, making transatlantic travel a pleasure even for those traveling on business.



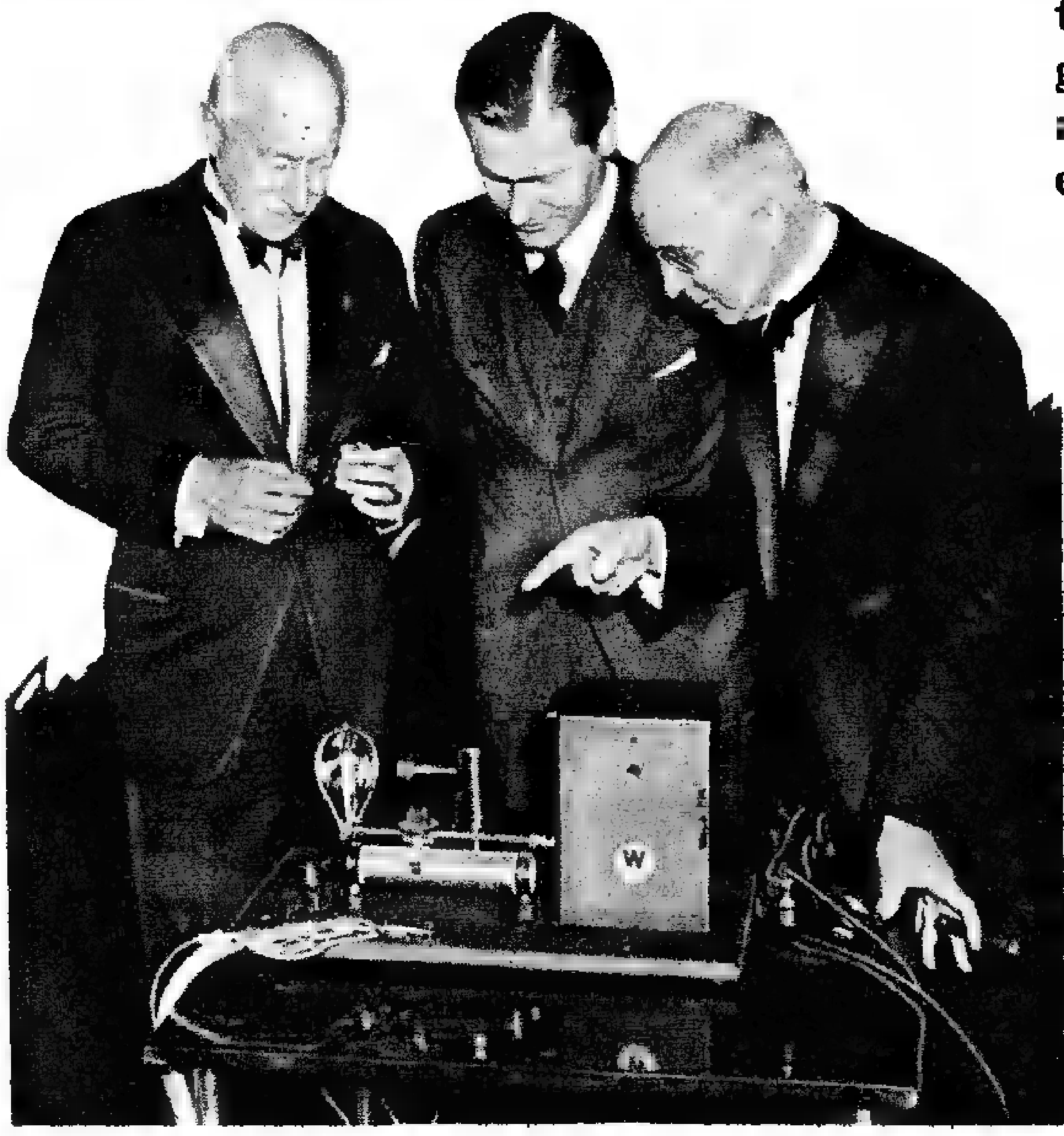
The new German Zeppelin LZ-129 is shown above compared in size with the new British vessel, *Queen Mary*. The size of the new Zeppelin can best be realized by the fact that it is only 200 feet shorter than the giant ship.

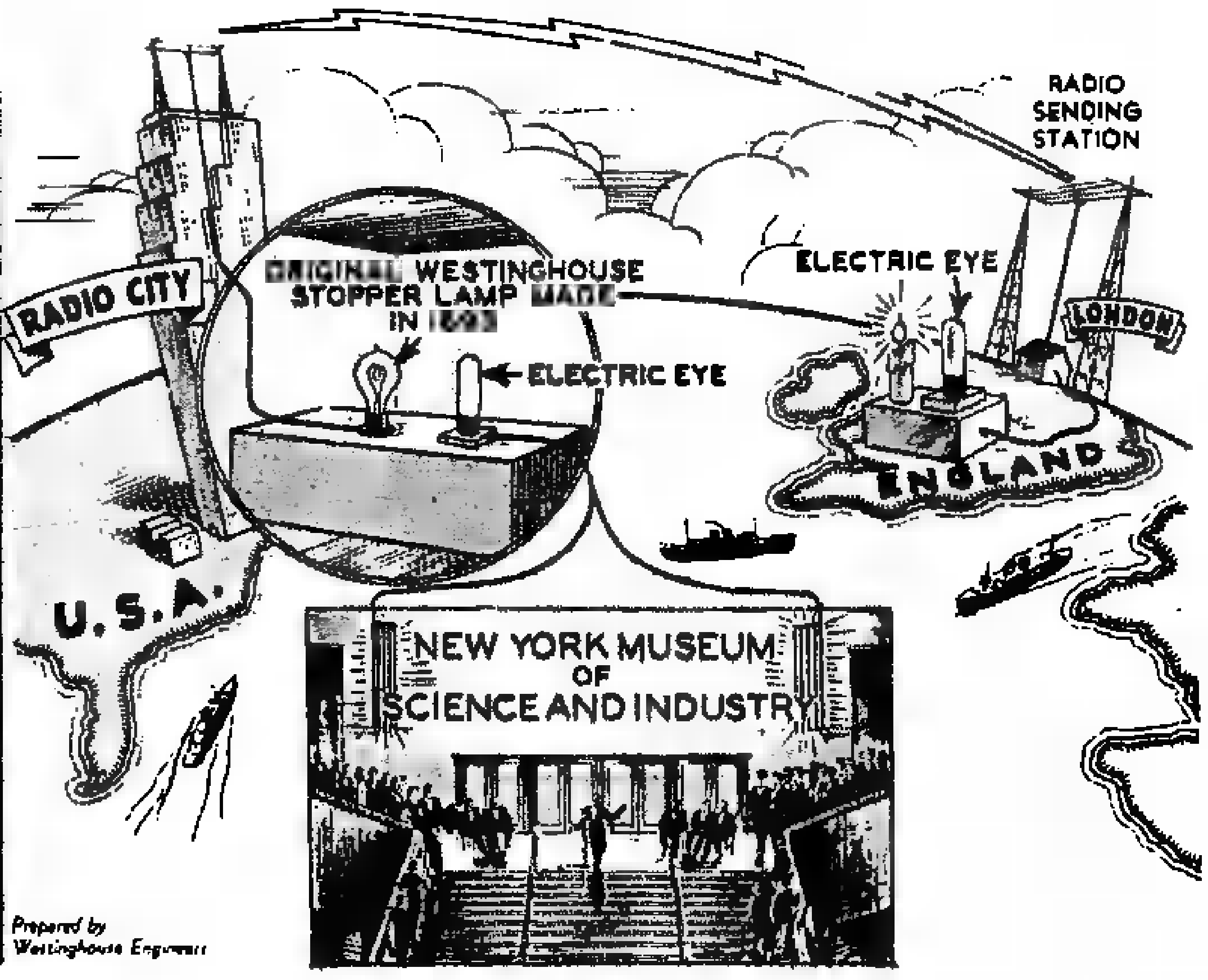
Scheduled to make their first voyages some time during the latter part of May they will bring the old and new world even closer together than they are at present. While not as luxurious as the Queen Mary, the LZ-129 incorporates many distinct features including a smoking salon, prominade deck and large roomy cabins as well as the important factor, speed.

The Queen Mary, with possibly one or two exceptions, will be the finest ocean going craft ever to cross the Atlantic. While not the largest, the new ship will, no doubt, cut the crossing time by several hours. In order that its passengers' minds will be kept occupied the ship has been fitted with a theater, swimming pool, game rooms, libraries, lounges and beautifully appointed cabins so as to make the voyage a most enjoyable one.

Flame In London Opens Museum

INCREDIBLE, yet an actuality was the opening of the New York Museum of Science and Industry located in Radio City by a candle flame burning in London. In the laboratories of Faraday House Sir William Bragg, noted English scientist, struck a match and lit a small candle. A nearby photoelectric eye responded to the light and sent an impulse to the short wave transmitters of the British Broadcasting Company where the signal was relayed to America. In New York the signal caused an ancient stopper lamp to glow, actuate another photo cell and turn on a bank of mercury vapor lamps opening the exhibit.




RADIO SENDING STATION
RADIO CITY
ORIGINAL WESTINGHOUSE STOPPER LAMP MADE IN 1893
ELECTRIC EYE
ELECTRIC EYE
LONDON
ENGLAND
U.S.A.
NEW YORK MUSEUM OF SCIENCE AND INDUSTRY
Prepared by Westinghouse Engineers

Dr. Frank Jewett, president of the New York Museum of Science and Industry, describes to fellow scientists the workings of the stopper lamp, photo electric cell and relay used in the unusual dedication ceremonies. Above, at right, is shown the artist's conception of the broadcast showing the various stages through which the impulse produced by the candle flame, passed.

FEEDING *America's*

America has an insatiable appetite for games, but it is subject to whims. Feeding this appetite is a game itself, and one never knows which way to jump.

Above—Oswald B. Lord, standing, supervises the play of his new game, Politics. Thousands of people are spending their evenings with this game, in an attempt to become President.

AMERICA likes to play. Whether they know it or not, millions of otherwise rational Americans are forever waiting to be caught in the craze for a new puzzle, a new diversion, a new game. The very word "game" sounds trivial, but it isn't. Games have a powerful influence on the social life of the world, and—games are the delight and the despair of the men who invent them.

America likes to play, and is willing to pay for its fun. Right now it is playing a new game called Monopoly. Already the fastest-selling non-card pastime in the country, Monopoly bids fair to break all-time popularity records.

Like parcheesi, Monopoly is played by shaking dice and moving tokens around a spaced board. But there the similarity ends. The Monopoly player is furnished at the outset with a handful of script money. When his dice land him in an unoccupied "street" he may purchase holdings there, and may levy rent from any other player unfortunate enough to fall in his domain. If he is clever he may acquire hotels, utilities and railroads. The ultimate object, of course, is to maneuver assets so cunningly that all other players are left bankrupt, with the winner holding all. The spendthrift player who manages his finances poorly finds himself utterly ruined.

Out of the East came Mah Jongg to captivate the public for a season. It proved too technical, however, and was lost.

Monopoly, though it has taken hold only during the past year, has more than three decades of history behind it. In 1904 a young woman of Virginia named Mrs. Elizabeth Magie Phillips devised a game which she called "Landlord." Her motive was not to make money, nor primarily to furnish amusement.

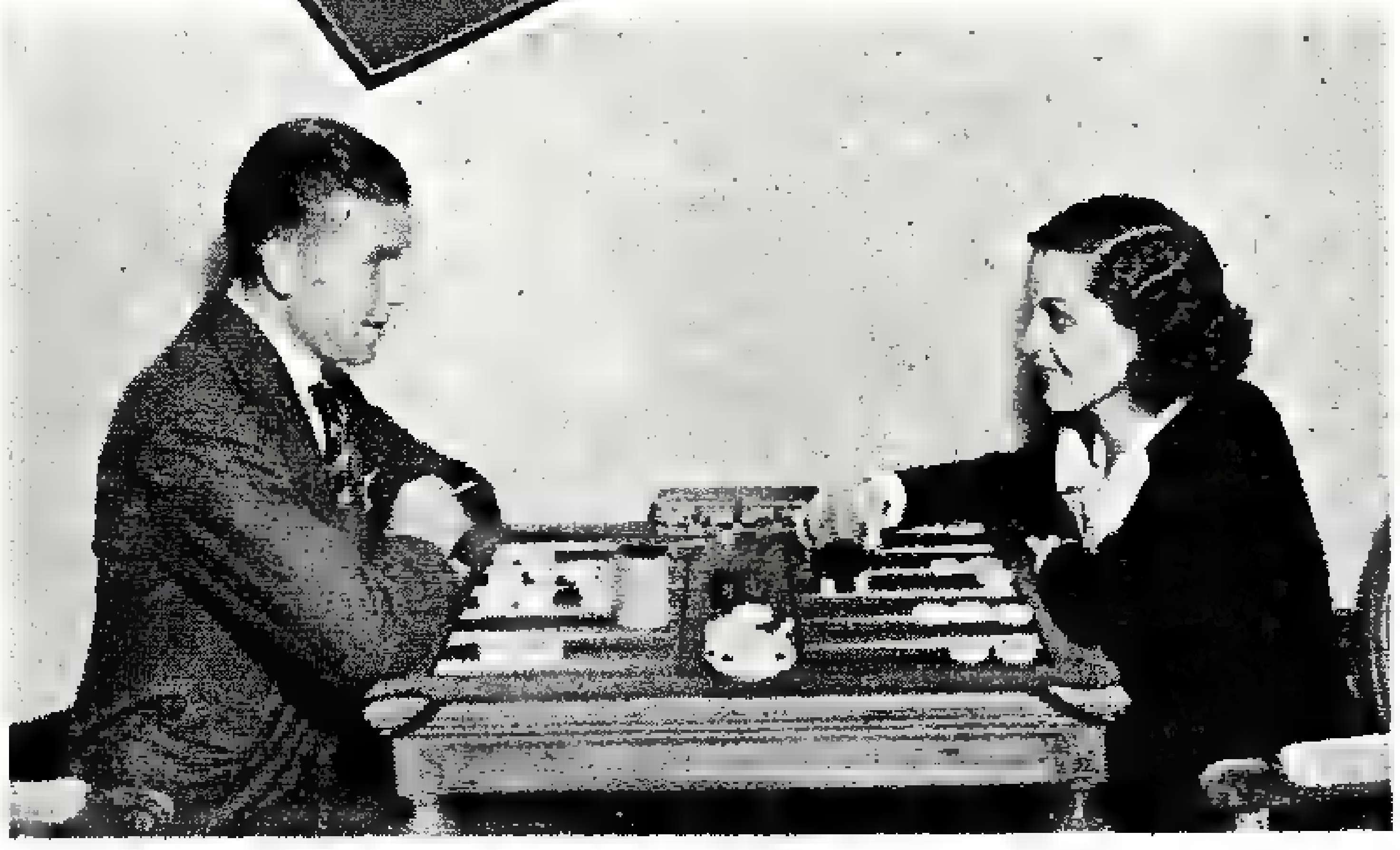
"I conceived the game of Landlord to interest people in the single-tax plan of the great economist, Henry George," said Mrs. Phillips recently.

The game continued to be played in a small

Appetite *for* GAMES

by
W. A. SWANBERG

More than 30 years ago Mrs. E. M. Phillips, above, devised a game called Landlord to interest people in a single tax plan. This game grew into Monopoly, another sensation of the year. Left—Not even the army escapes America's craving for games. In this game, called Battle, armies are moved over the board to strategic positions in an effort to wipe out the foe. Railroads, highways and airplanes add to the complications.



Following close upon the heels of Mah Jongg as a parlor pastime came Backgammon. This game is not new, having been played in England for centuries. It is still popular.

way, and in 1924 Mrs. Phillips patented a variation on it which she called "The Landlord's Game." This version later fell into the hands of Charles B. Darrow, of Philadelphia. Darrow revised the game and patented it. In 1931 he sold a few sets to friends, and finally interested a large Philadelphia department store in the idea.

Parker Brothers, of Salem, Massachusetts, foremost manufacturers of games in the country, at first rejected Monopoly because in their opinion it required too many parts and took too long to play—three hours or more. By spring, however, the game attained such popularity that the Salem firm bought it under the patents of both Mrs. Phillips and Mr. Darrow.

While Monopoly was beginning its amazing rise, Oswald B. Lord, a young textile executive in New York City, set his agile mind to devising a game with a new twist.

"Games have always been something of a hobby with me," he said. "But it struck me that most new games were not really new at all, but were merely variations on old favorites like parcheesi, chess and checkers."

Oddly enough, it was while taking a hot shower that Mr. Lord pounced on a subject that offered excellent possibilities for a game. Politics! What with a presidential campaign

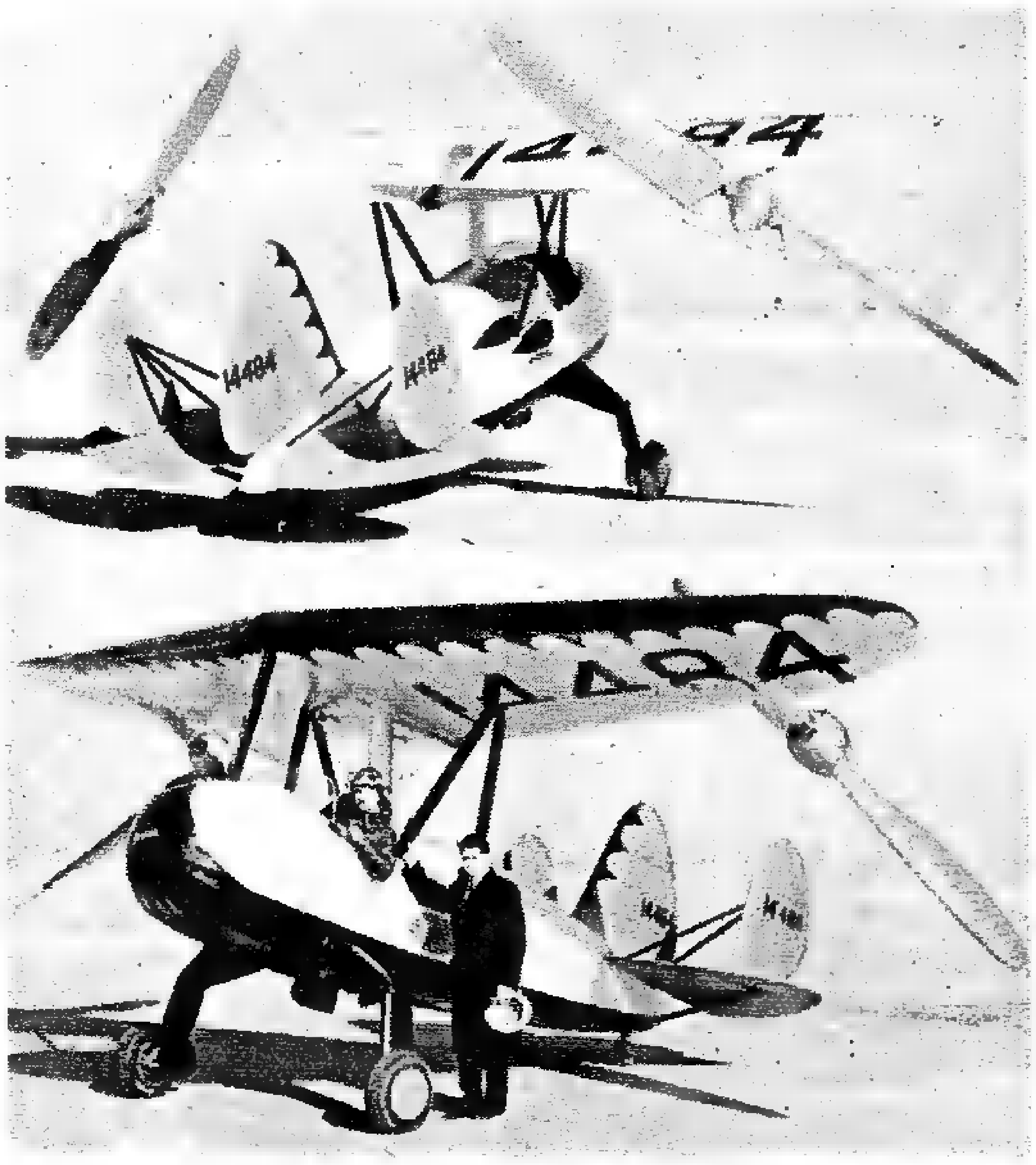
[*Continued on page* 134]

Tiny Dual Propelled Plane Takes Flight Like Autogyro

EMPLOYING a new principle in flying that permits takeoffs over very short runs a tiny craft rose above a crowd of unlookers at Denver airport much to their amazement. The airplane, the invention of F. Landgraf, a western aeronautical engineer, employs dual propellers which change pitch as they revolve so as to lift the plane with each revolution instead of just carrying it forward.

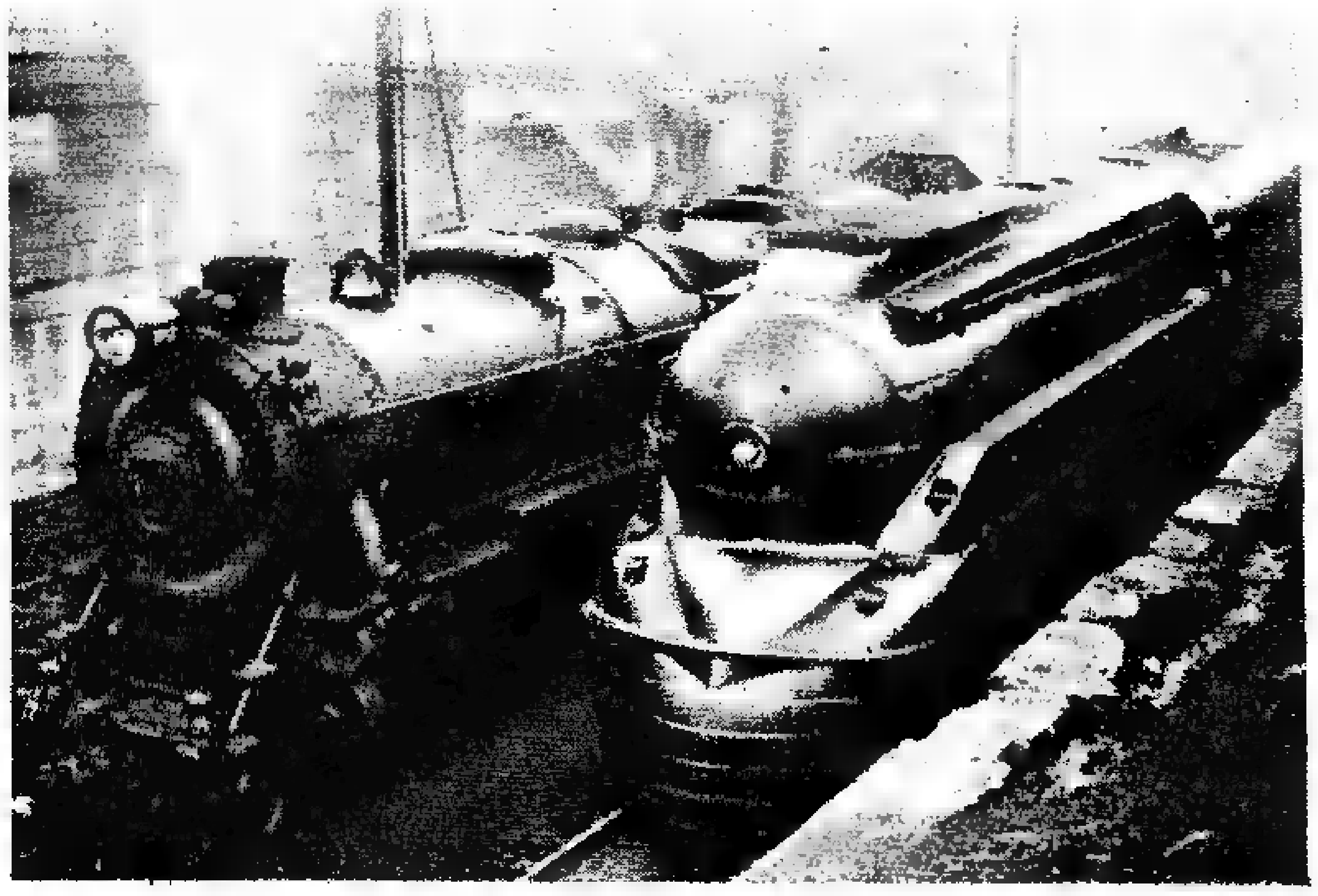
The revolutionary feature of the plane is the two rotors and their placement. Mounted directly behind the wing they change their angle of attraction with each revolution, coming down more or less flat and coming up almost edgewise. This construction permits the blades to offer little resistance on the up stroke and a great amount on the down.

The plane, which required eighteen months to construct, is expected to change present light plane design. Not only will the new ship offer many safety features but will assist in the opening of the light plane field.



Capable of rising from the ground with only a short take-off the new Lewis-Landgraf plane, shown above, combines features of the conventional airplane with those of the autogyro.

Locomotive Dons Streamlined Dress



Pictured beside the familiar steam locomotive is one of the latest streamlined types soon to be placed in regular passenger service by the Pennsylvania Railroad for long distance runs.

KEEPING in step with the times the Pennsylvania Railroad recently completed a streamlined locomotive said to be the finest yet to be perfected by aerodynamic science. Using a standard steam type locomotive, a special metal shell was constructed around it so as to bring wind resistance to a minimum.

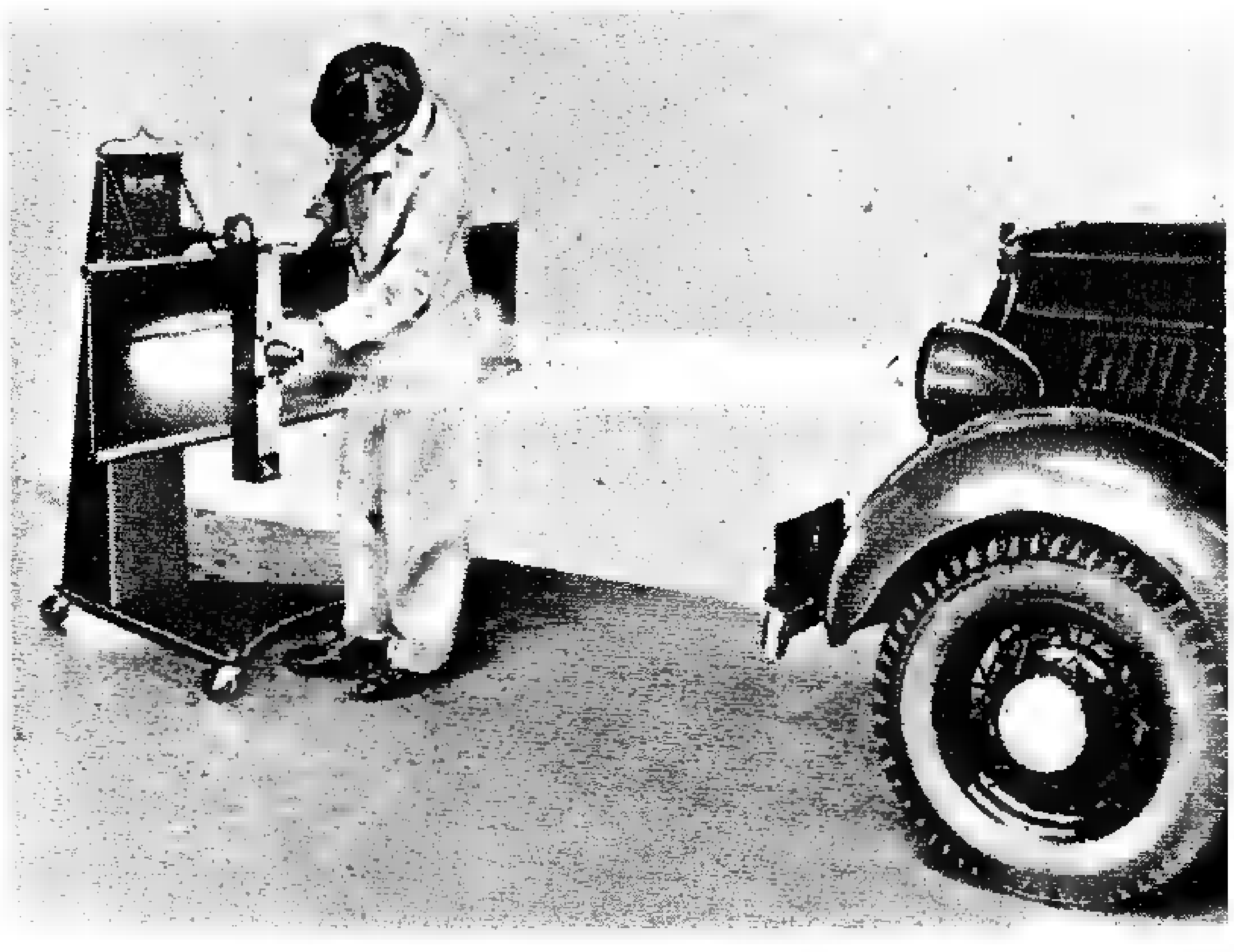
The new housing is said to reduce resistance more than one-third at speeds of a mile-a-minute or more.

Intended for high speed distant runs the locomotive is the forerunner of a fleet of this type. The new design results in a fuel saving equivalent to 300 horsepower.

Electric Eye Tests Auto's Lights

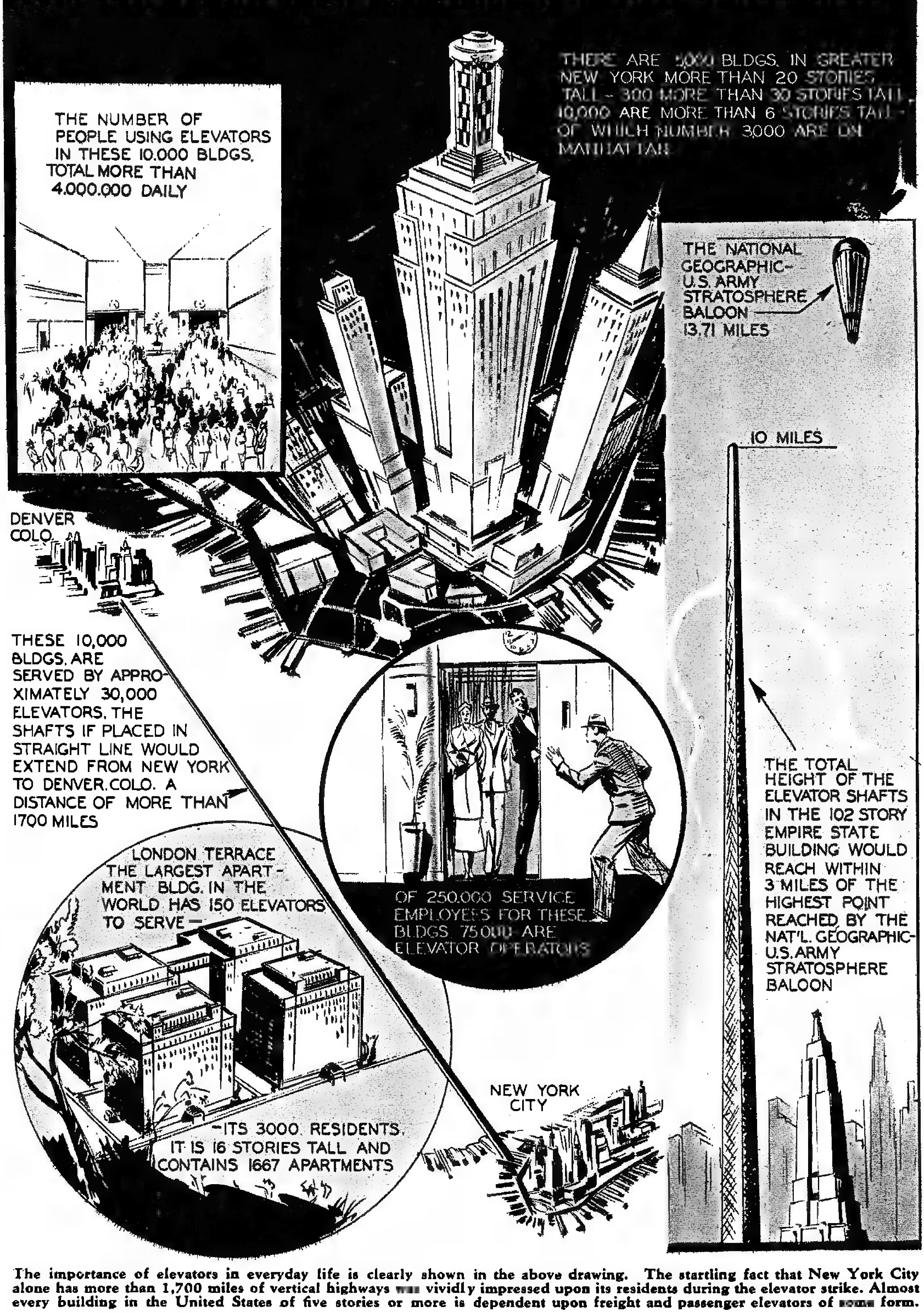
NO LONGER is a long driveway necessary for testing the beam and brilliancy of automobile headlights. Recently introduced to the automotive world, a headlight adjustment instrument permits the car owner to have his lights checked in a fraction of the usual time required.

A photoelectric cell connected to a micro-milliameter is adjusted on the instrument until the meter indicates lights are in exact focus.



Adjustment of automobile headlights is simplified through the use of this instrument which employs a photoelectric cell and a sensitive micro-milliameter to determine focus.

New York's VERTICAL HIGHWAYS Total 1700 Miles


THERE ARE 5,000 BLDGS. IN GREATER NEW YORK MORE THAN 20 STORIES TALL – 300 MORE THAN 30 STORIES TALL – 10,000 ARE MORE THAN 6 STORIES TALL – OF WHICH NUMBER 3,000 ARE ON MANHATTAN
THE NUMBER OF PEOPLE USING ELEVATORS IN THESE 10.000 BLDGS. TOTAL MORE THAN 4.000.000 DAILY
THE NATIONAL GEOGRAPHIC-U.S. ARMY STRATOSPHERE BALOON 13.71 MILES
10 MILES
DENVER COLO.
THESE 10,000 BLDGS. ARE SERVED BY APPROXIMATELY 30,000 ELEVATORS. THE SHAFTS IF PLACED IN STRAIGHT LINE WOULD EXTEND FROM NEW YORK TO DENVER. COLO. A DISTANCE OF MORE THAN 1700 MILES
THE TOTAL HEIGHT OF THE ELEVATOR SHAFTS IN THE 102 STORY EMPIRE STATE BUILDING WOULD REACH WITHIN 3 MILES OF THE HIGHEST POINT REACHED BY THE NAT'L. GEOGRAPHIC-U.S. ARMY STRATOSPHERE BALOON
OF 250.000 SERVICE EMPLOYEES FOR THESE BLDGS. 75.000 ARE ELEVATOR OPERATORS
LONDON TERRACE THE LARGEST APARTMENT BLDG. IN THE WORLD HAS 150 ELEVATORS TO SERVE – –ITS 3000 RESIDENTS. IT IS 16 STORIES TALL AND CONTAINS 1667 APARTMENTS
NEW YORK CITY

The importance of elevators in everyday life is clearly shown in the above drawing. The startling fact that New York City alone has more than 1,700 miles of vertical highways was vividly impressed upon its residents during the elevator strike. Almost every building in the United States of five stories or more is dependent upon freight and passenger elevators of some form.

He Made Sky

THE STORY OF

The aerial rapid action camera, modern flying mate of the well-known press camera. Note how easily a finger can trip or wind the shutter, advance fresh film and aim it for more exposures. Thus the camera becomes an integral part of the photographer, who operates it with the same ease as he does his automobile.

High above the broken floor of the Rio Grande River basin, an airplane growls monotonously over 32,000 square miles, each click of its Cyclopean camera bringing nearer to completion the largest photographic mapping project ever undertaken in the United States.

EXACTING and tedious is the scientific job of gathering up 32,000 square miles and literally pasting them in your hat. Only one man is utterly capable and he is the fellow who supervises the shooting and assembling of this vast mosaic.

He is the 39-year-old president of the Fairchild Aviation Company—Sherman M. Fairchild. The planes are his, the cameras are his and the science of aerial mapping grew from the two decades of study he put into air photography.

It isn't easy even now, this business of sweeping up miles and not losing a single detour. And it wasn't easy back in 1918, when Fairchild tried to interest U. S. Army officials in his new and revolutionary type of aerial camera, for he met with polite indifference and downright skepticism. But today he is world famous as the man who made sky mapping a big business. His latest invention, a $26,000 ten-lens camera, will photograph in one operation a ground area twice the size of New York City.

Fairchild's interest in photography began while he was still in college. After the army had rejected his new type of aerial camera, he went to work in the engineering department of the Eastman Kodak Company. Then, again in 1922, he tackled army officials once more, this time persuading them to purchase twenty of his new cameras for $1,800 apiece.

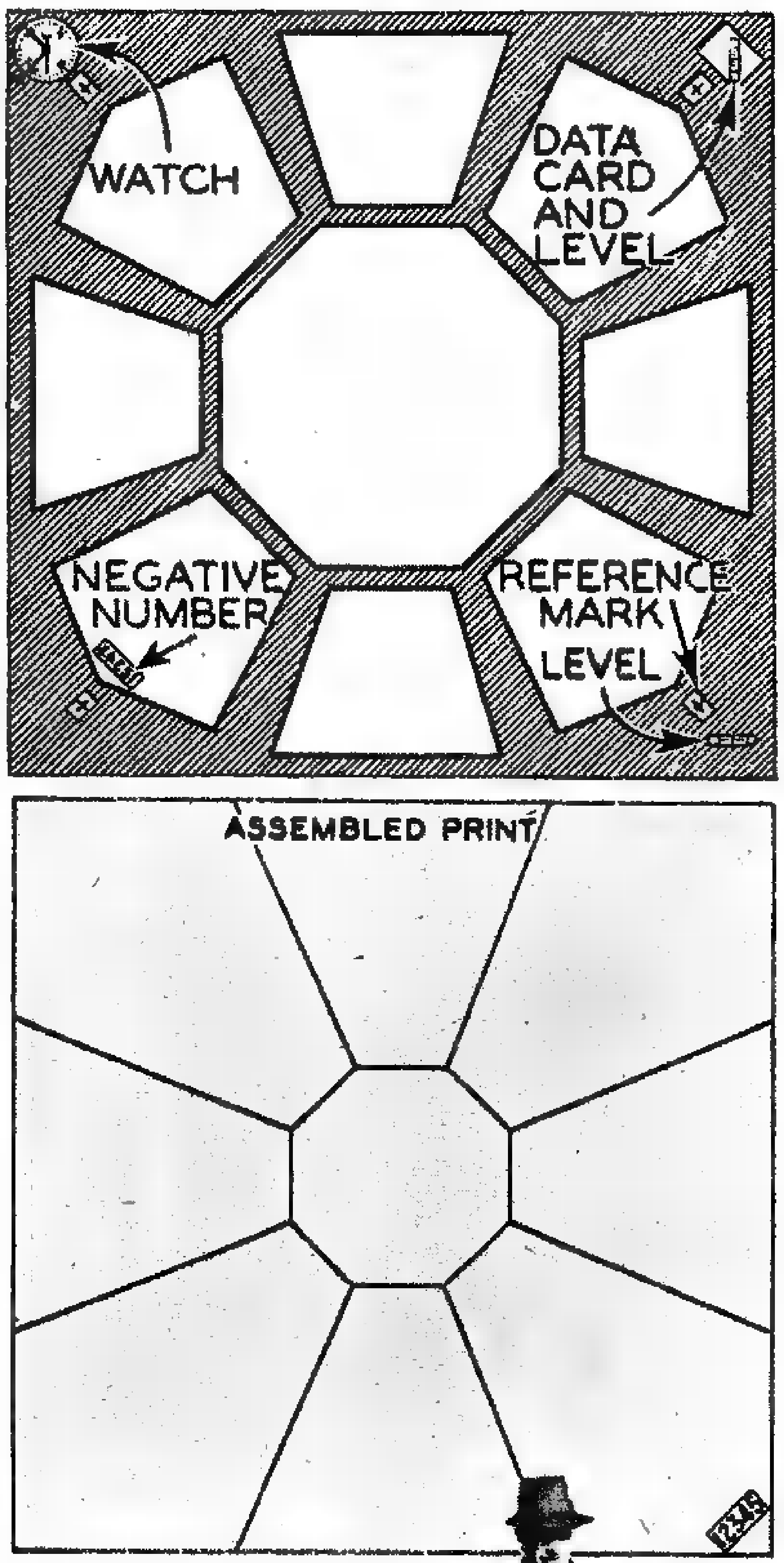
Two years later found him organizing an aerial magazine and newspaper photographing service, with two planes from Huff-Daland & Company and representing them exclusively in the field of photography planes. But no clients appeared. Just when he was ready to give up an order came from the Brazilian Government for two machines.

Jubilant, he informed his sponsors, only to learn with dismay that his agency contract had expired three days previously. This news was a bitter pill to swallow but young Fairchild got out of that predicament by cabling Brazil that his present planes were "unsatisfactory" and that newer and better ships had just been developed. Brazilian officials took him at his word and ordered two.

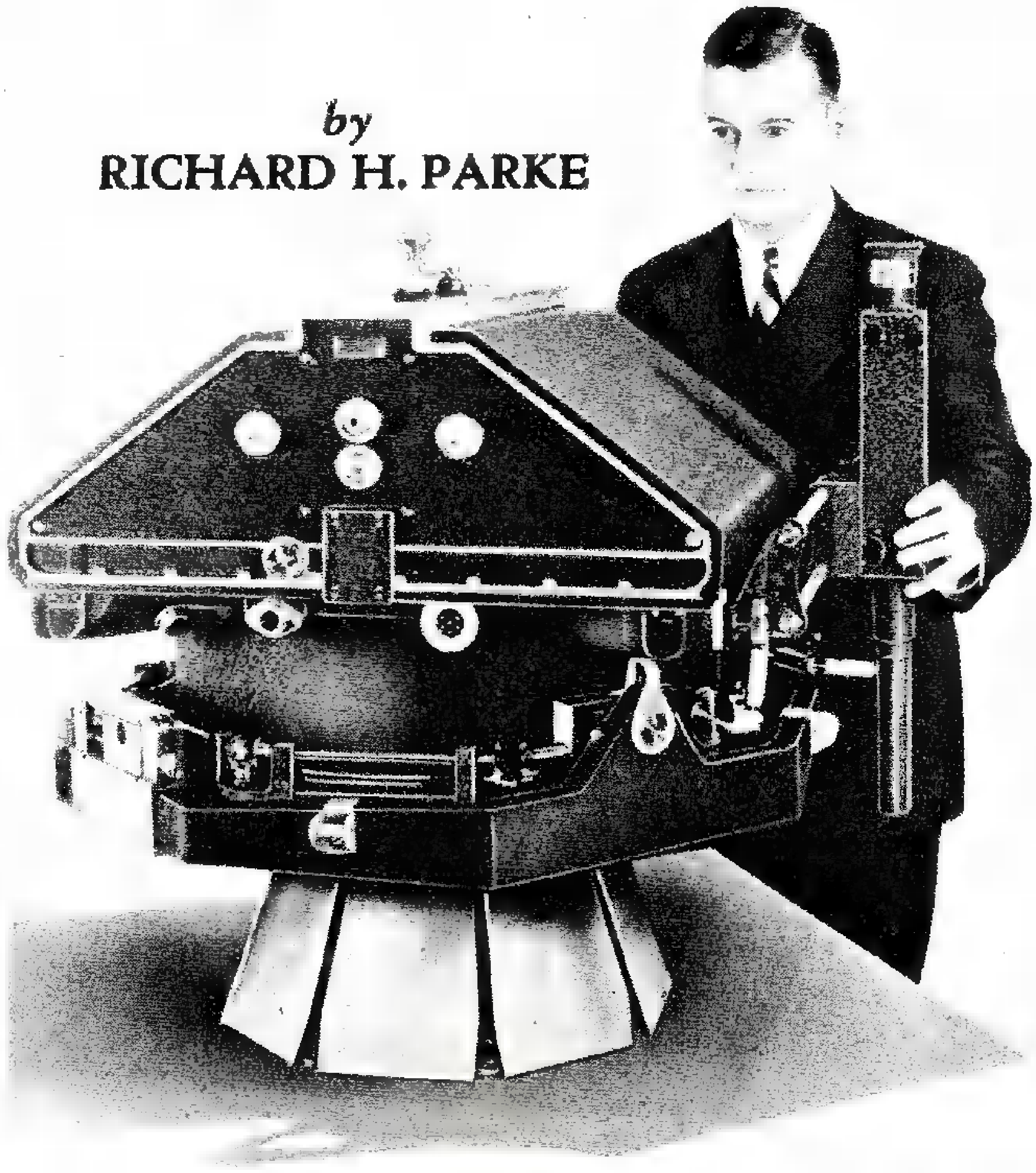
At that time one of the greatest airplane designers, Igor Sikorsky, was at Roosevelt Field—loafing. Fairchild hired him on the spot. Sikorsky jumped at the chance—his first job in America since he came over from Russia as a refugee. And the contract with Brazil was fulfilled successfully. A Fairchild

Mapping a Big Business

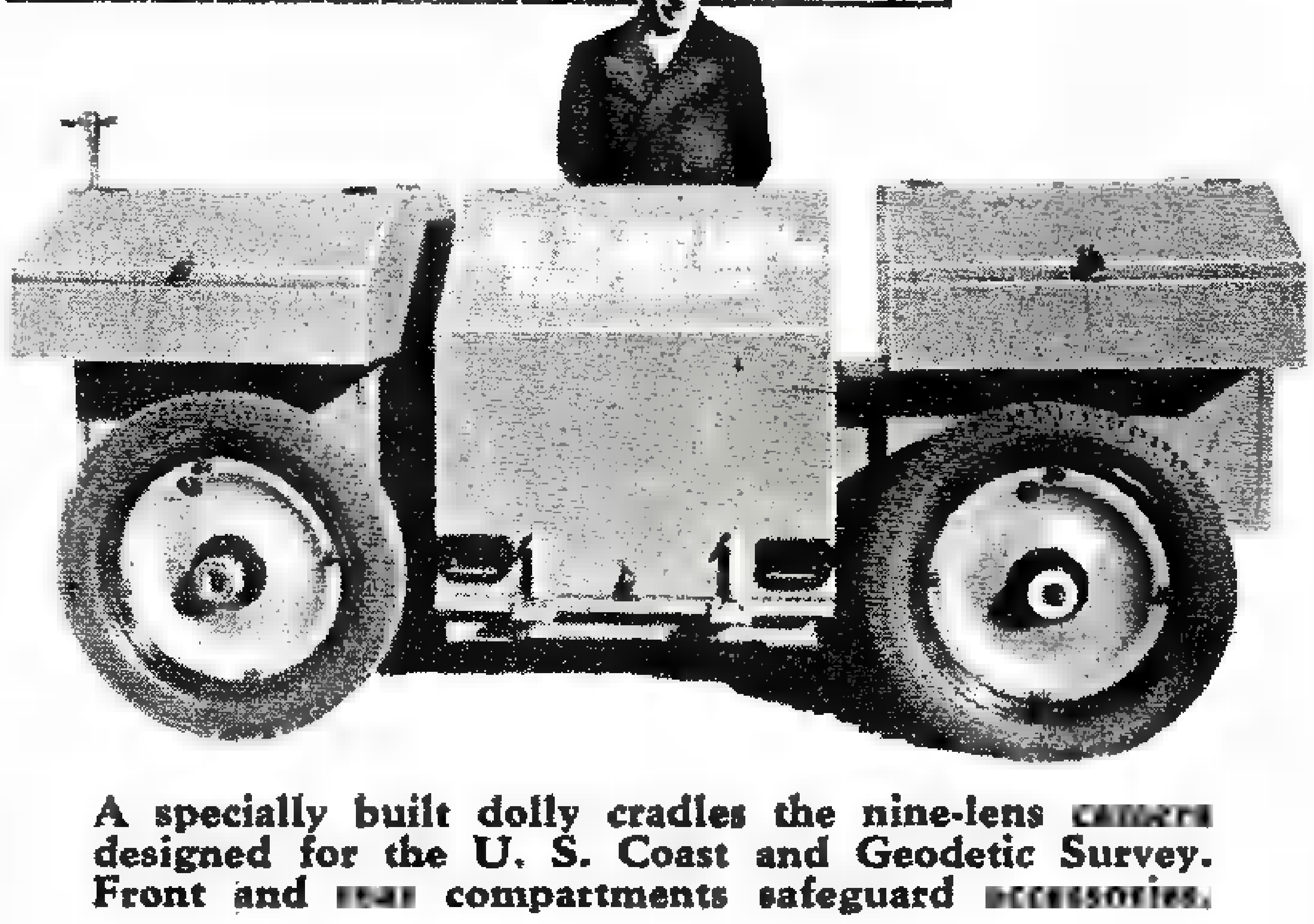
SHERMAN M. FAIRCHILD AND HIS AERIAL CAMERA



by
RICHARD H. PARKE



Sherman M. Fairchild and his nine-lens single unit aerial camera. The diagram (upper left) is that of the negative, under which is the print. The watch, negative number, reference marks, level and data card are photographed simultaneously with the remarkable nine-view picture.



A specially built dolly cradles the nine-lens camera designed for the U. S. Coast and Geodetic Survey. Front and rear compartments safeguard accessories.

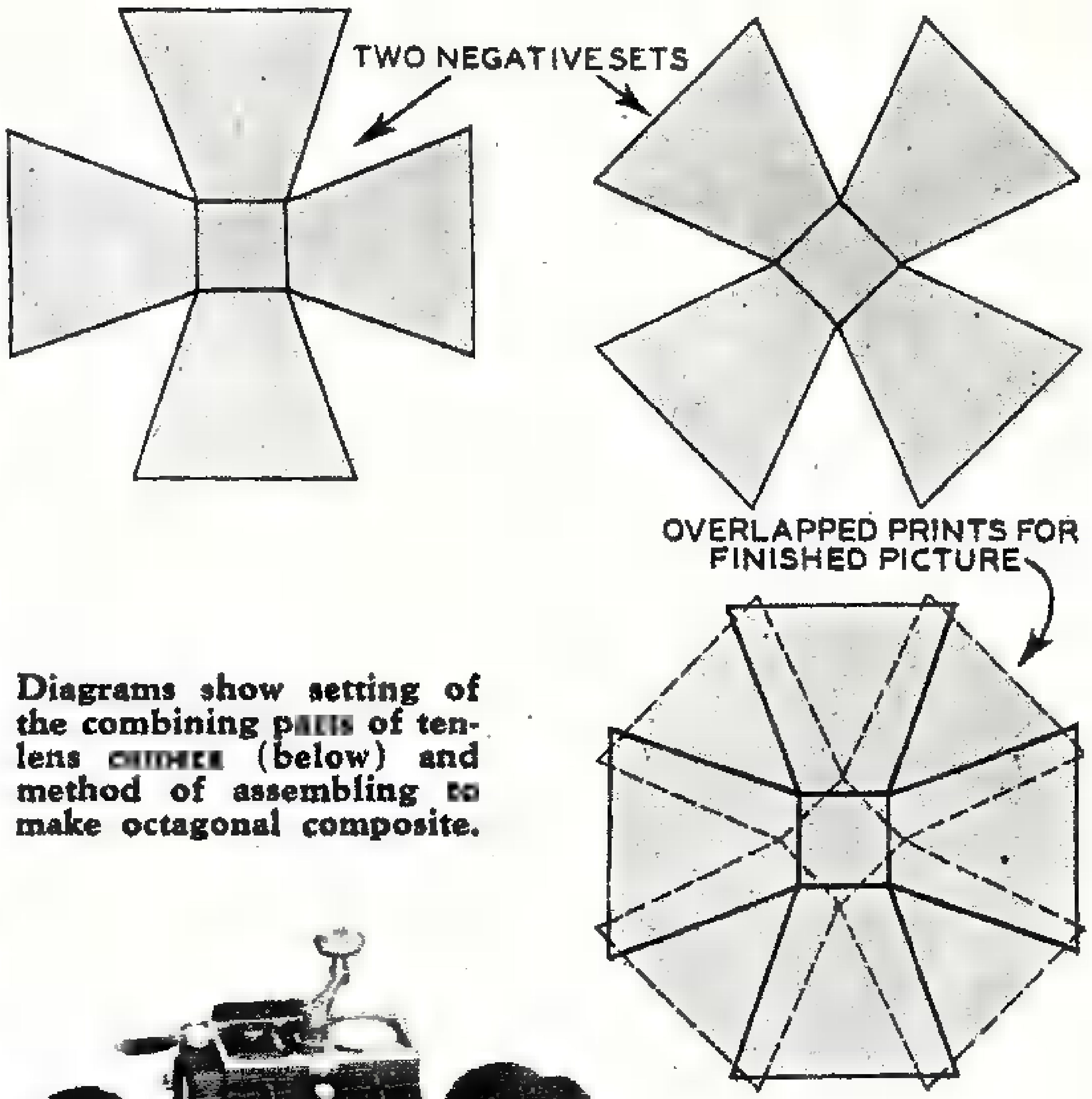
cabin monoplane is now a common sight, and this company ranks among the leaders in American private plane production. The corporation has four subsidiaries, manufactures 75 per cent of the world's aerial cameras and owns the largest aerial picture library in existence—in fact, the entire world.

Already referred to is Fairchild's latest survey—the Rio Grande project. This is the third consecutive job his organization has undertaken for Uncle Sam. The first two were the aerial mapping of Boulder Dam and 25,000 square miles of watershed in the Indian Reservations of Arizona, New Mexico and Utah.

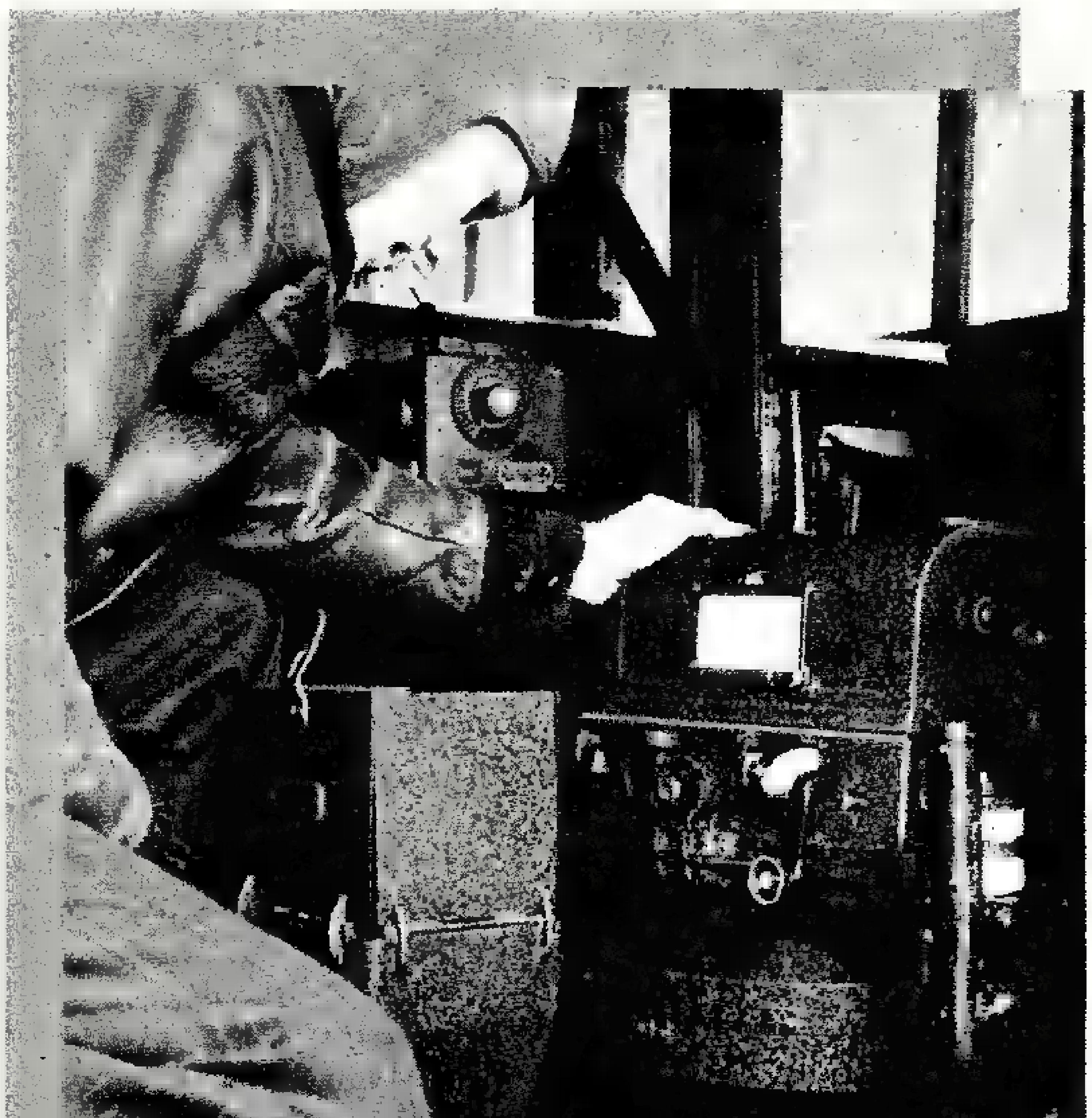
All these jobs, which take in more than 84,000 square miles of terriotory, are part of the government's program for soil conservation. From the completed maps, experts will be able to plan the control of this vital problem and, in the case of Boulder Dam, will be able to determine in advance the number of auxiliary dams needed to control the silt now being washed into the reservoir from the various tributaries.

Preparing an aerial map involves a tremendous amount of detailed work, work

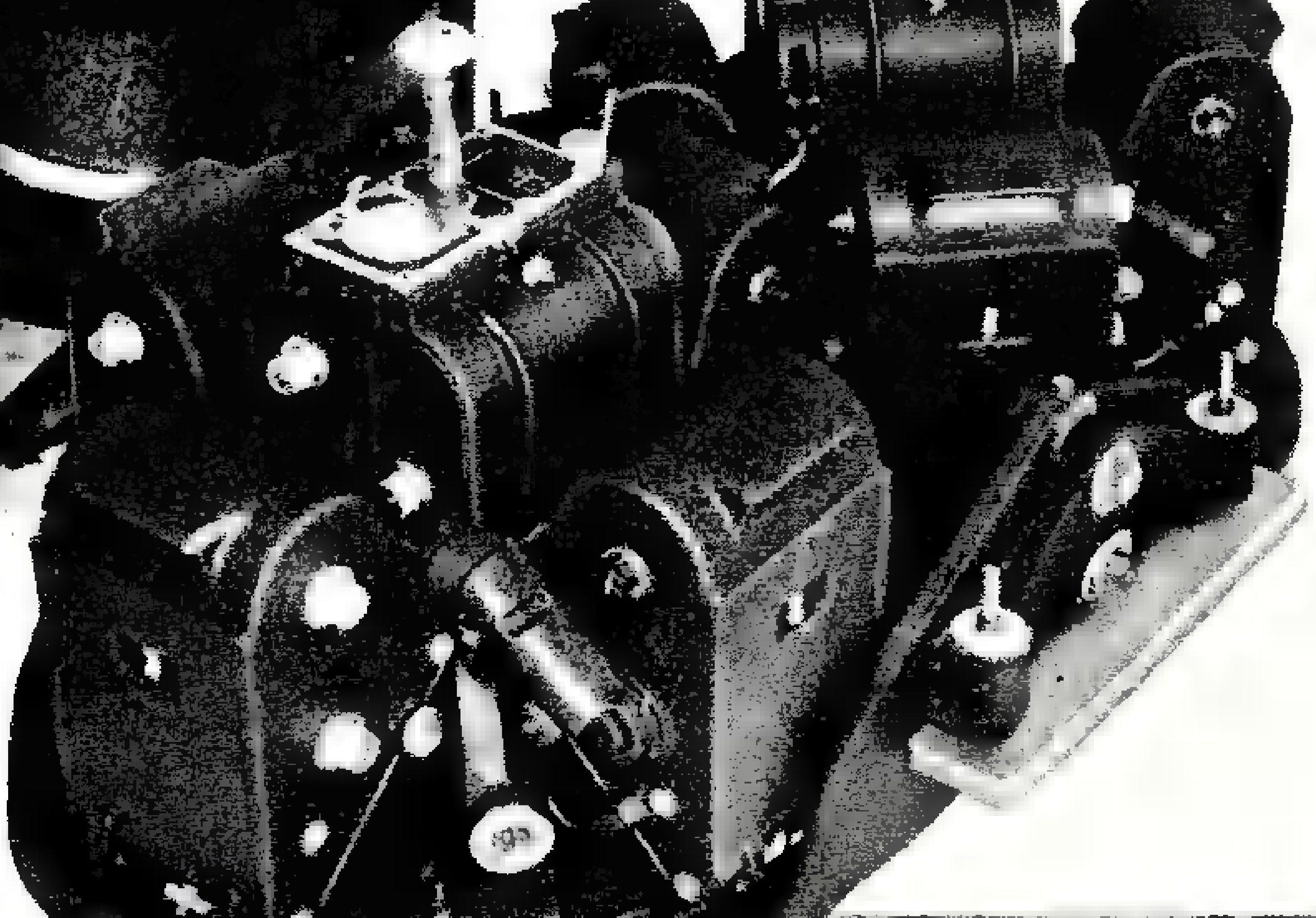
HOW The CAMERA Snaps TEN FILMS Simultaneously



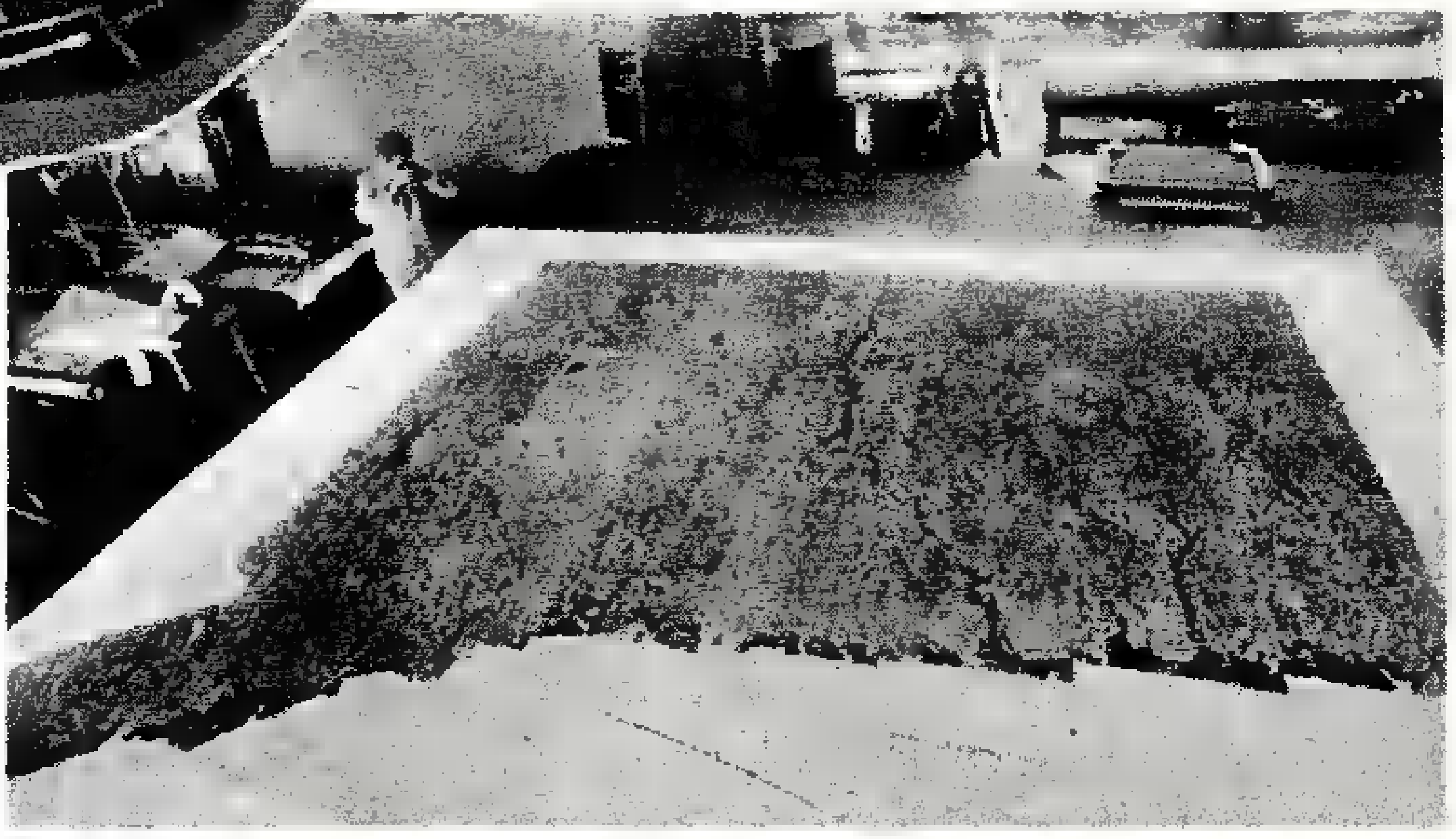
Diagrams show setting of the combining parts of ten-lens camera (below) and method of assembling to make octagonal composite.



Aligning the camera by hand, with the units set at a 45 degree angle to each other in order to get a photograph of the entire area. In flight, of course, the cameras function automatically, with photographer keeping constant check.



Beneath is the world's largest photograph. It shows every square inch of Connecticut's 5,004 square miles. Homes, even hedges, stand out in microscopic clarity and are very easily idenitfied. Photograph measures only 18 feet in length and is 13 feet high.



which can be entrusted only to men skilled in the art of aerial photography.

First, before any flying is started a sketch of the operations contemplated is drawn on a master chart, the area being split into small working assignments by dividing it into a number of parallel, rectangular strips. Each strip represents the central portion of photographs to be taken during a single flight across specified ground.

On this master chart is recorded the elevation from which each strip has to be photographed to obtain the desired scale, the altitude in each case being determined mathematically. The chart also shows the various landmarks, for these serve as guides to the pilot and photographer.

When the master chart is completed, the plan of operations is reviewed with the air crew and then the job of "flying the map" is begun. The pilot flies along the guide of flight lines back and forth, forming "strips" until the entire area is covered. Aerial photographic mapping operations are usually flown at altitudes as high as two to three miles, necessitating the use of oxygen by both pilot and photographer.

In mapping large areas a 5-lens camera is commonly used, pointing downward through a hole in the bottom of the plane. The

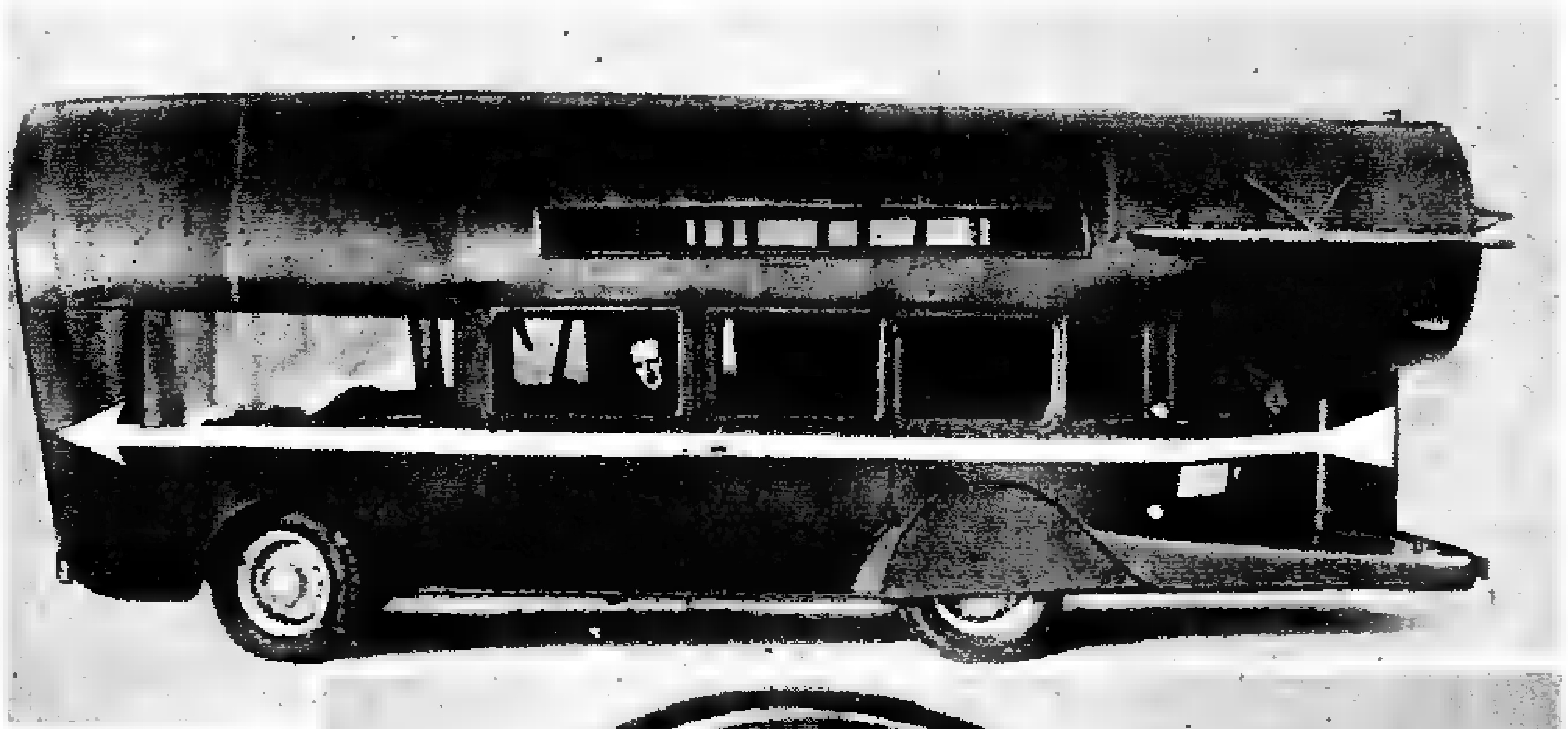
[*Continued on page* 136]

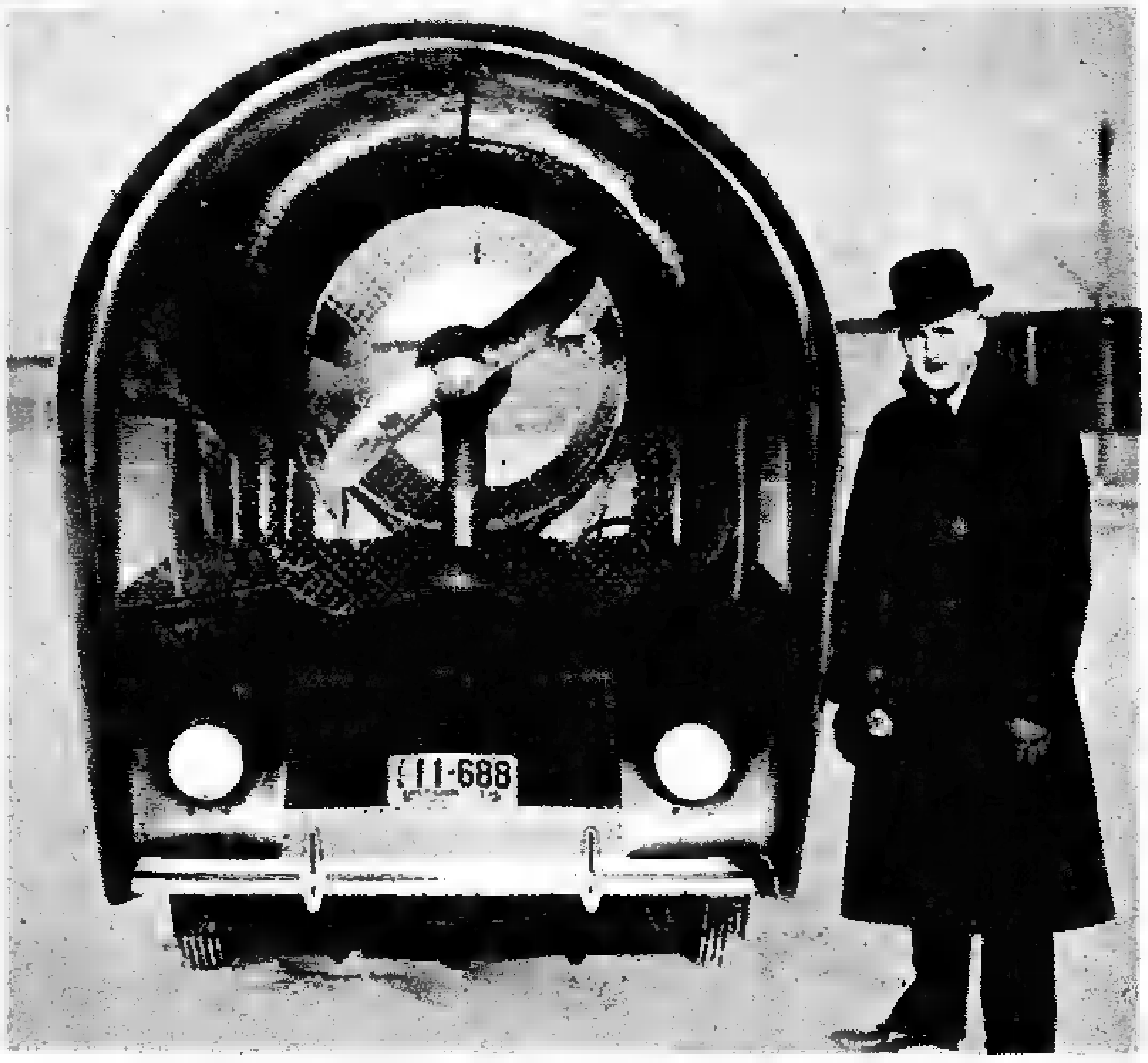
WIND-TUNNEL Auto Foreshadows New Airship

PROPELLED by driving air through a lengthwise tube, an unusual automobile was recently demonstrated at Kansas City airport by its inventor, Thomas M. Finley. The device, which is constructed on a V-8 Ford chassis, weighs 5,000 pounds and is capable of speeds of to 47 miles per hour.

Intended by the inventor to demonstrate to government officials the value of dirigibles patterned after it, the air speed of the craft's tube has reached 105 miles per hour according to reports.

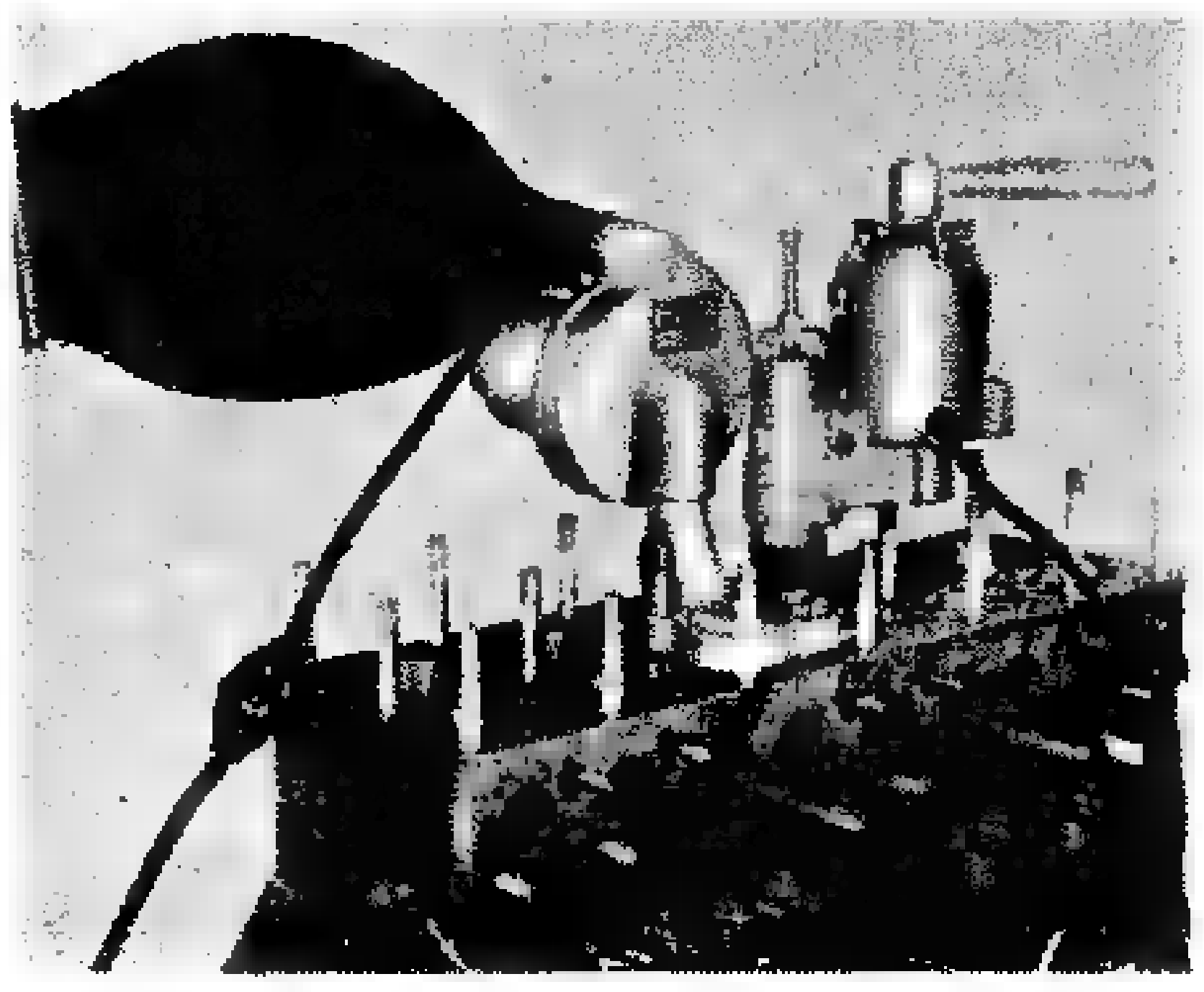
It is believed that by constructing the lighter than air craft in wind tunnel fashion not only will speed be increased, but the safety as well. The propeller located in one end of the wind tunnel creates a partial vacuum which constantly causes air to rush into the tube forcing the dirigible through the air.





Constructed as a demonstration model for government officials this strange automobile pictured here with its inventor, Thomas Finley, is driven by a propellor revolving in a wind tunnel.

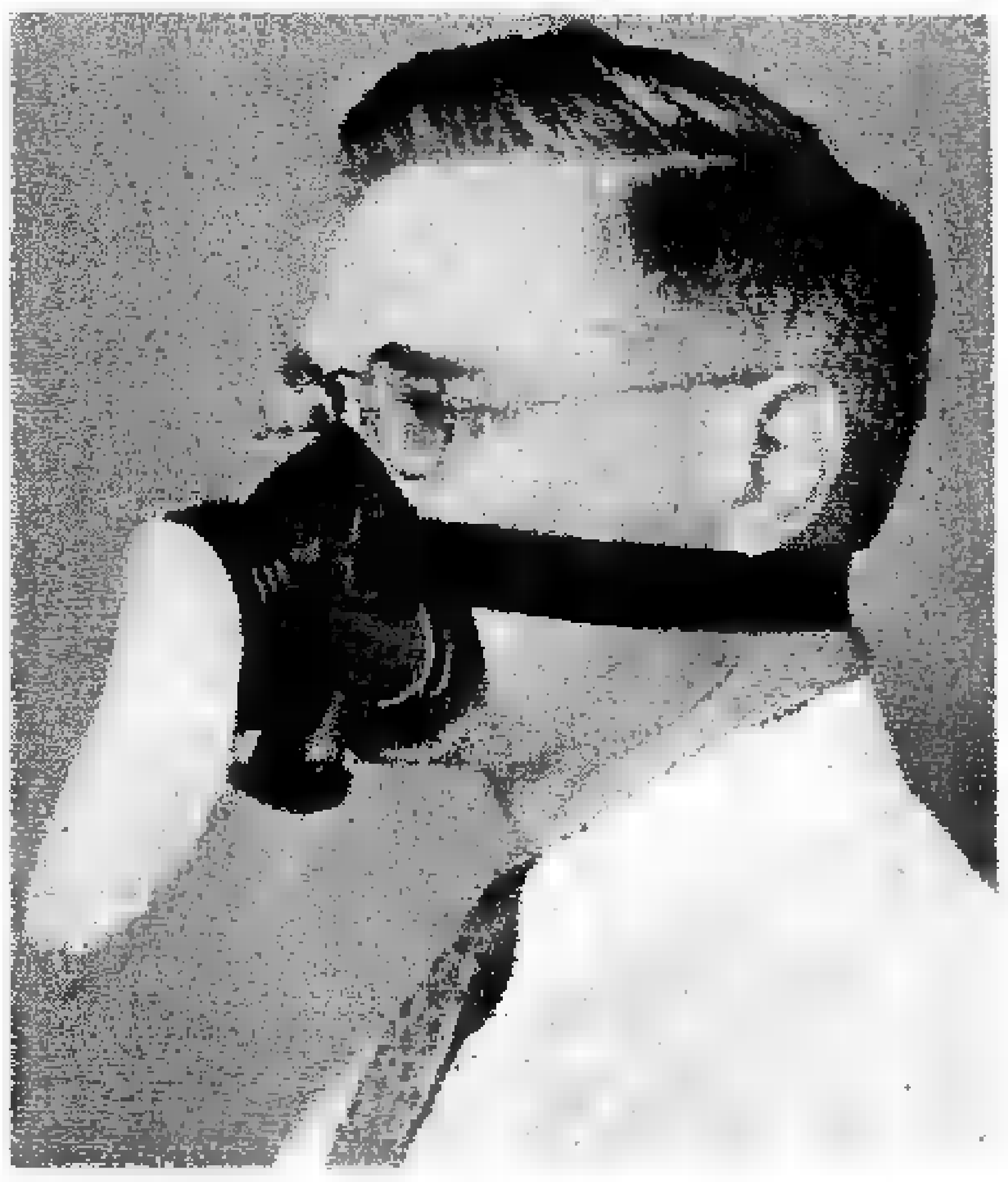
Vacuum Cleaner Is Shop Tool



Working in connection with any type of valve grinder this vacuum cleaner aids in auto. repair work.

DESIGNED to keep foreign matter, such as abrasives, out of the automobile motor during valve grinding, a mechanic's vacuum cleaner has been recently introduced.

New Respirator Aids Miner's Safety



While small in size this respirator is a proven safety factor for persons working in dust filled air.

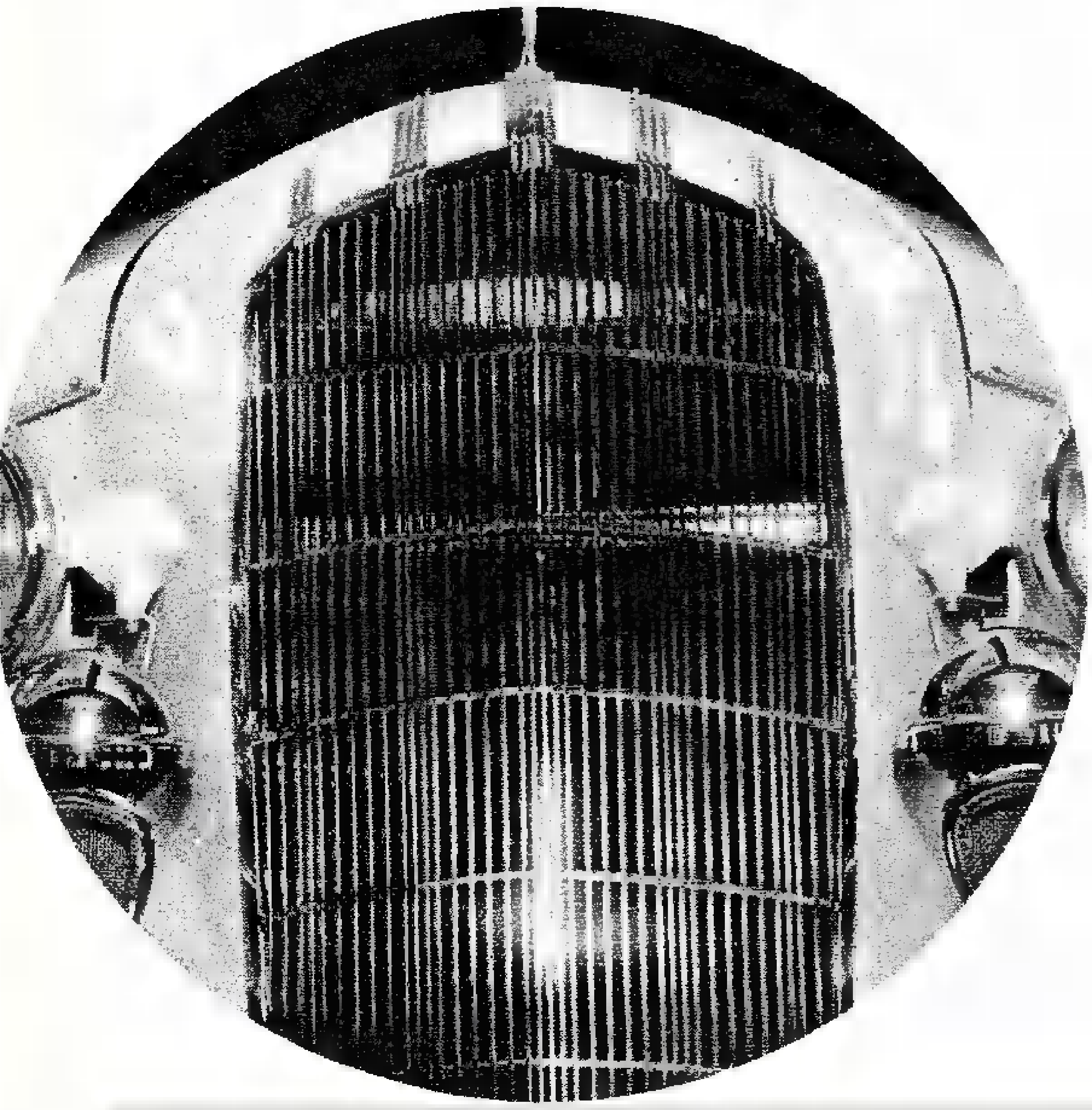
INTENDED for use in mines a new government tested respirator weighing only 5¼ ounces is the latest of safety devices for persons working in the vicinity of lead and other heavy dusts of poisonous nature. All parts are replaceable.

Street Cars To Follow Bus Design

SOON to make their appearance on the streets of Baltimore are 27 street cars representing the result of years of traction research. The cars, similar to those now in service in Washington, D. C., will be free from noise. They represent the latest in riding comfort. In design the cars follow closely the architecture of modern busses with slanting windshield, electric wiper and defroster. The cars have a top speed of nearly fifty miles per hour.

Streamlined and free from vibration this new noiseless street car is one of 27 to be placed in service shortly in Baltimore. Cars will be air conditioned and furnished with deluxe seats.

Do YOU Know CARS?



The Name of This Car Is

....

EVERY day you witness or participate in the parade of 1936 automobiles. You see new cars on every hand, but do you recognize the cars you meet? If you do, you have a good chance to win one of the 183 cash prizes in this big $1,000.00 contest.

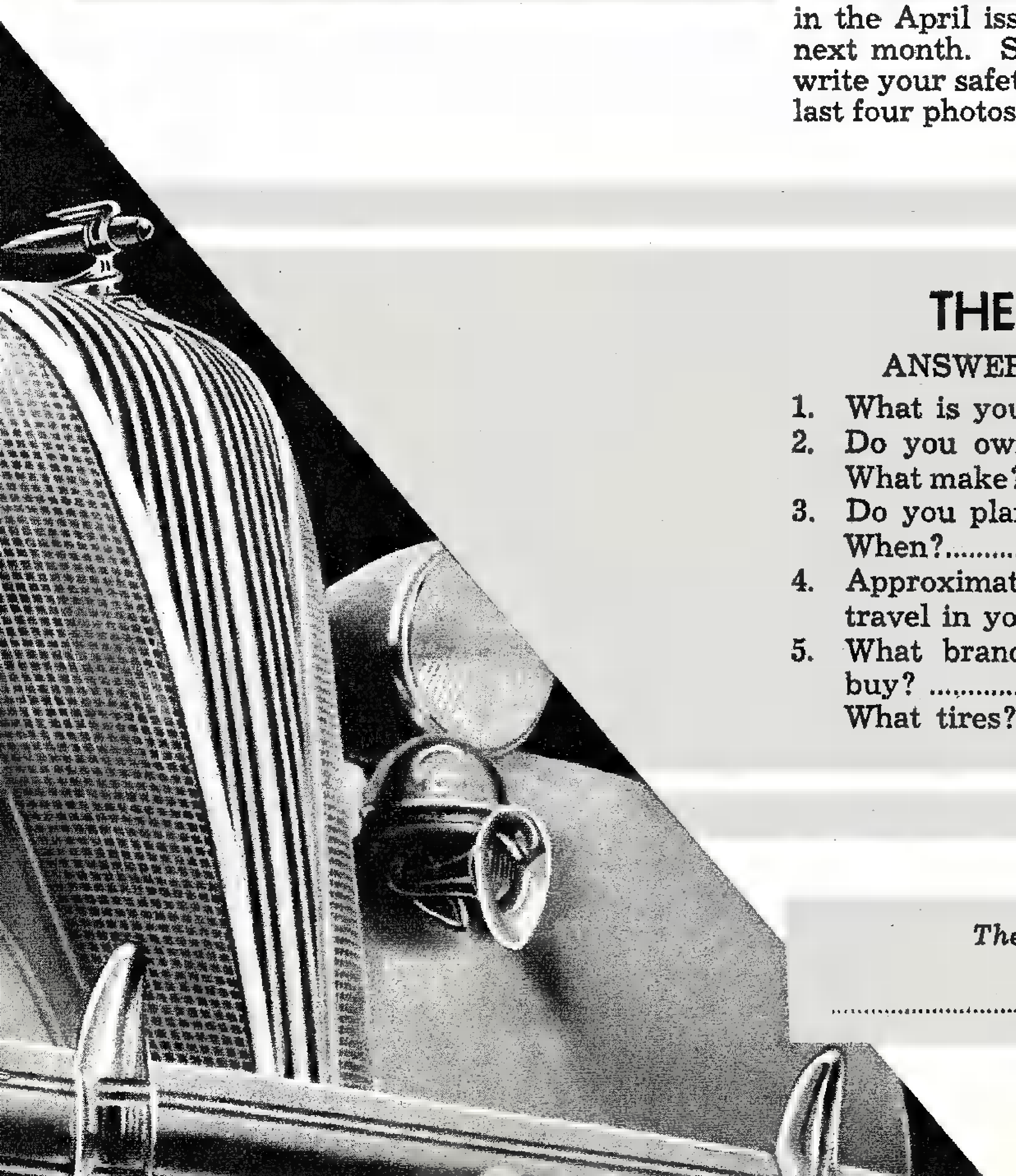
In this installment, the second of a series of three, there are printed the identifying features of four popular automobiles. All you have to do is write in the alloted space the name of the car from which the identifying feature was taken.

Less than 30 years ago it was possible to recognize your neighbors team of horses a half mile away simply by their gait. Whether or not this ability to identify familiar objects has been passed on to the auto-driving generation is the question that brought about this unique contest.

After identifying the cars, the next step is to write a ten-word safety slogan, something straight to the point which may be instrumental in saving hundreds of lives.

This slogan can be on any phase of motoring safety which will awaken the driver or pedestrian to his or her responsibility.

The first installment of the contest appeared in the April issue, and the third will appear next month. Study the rules carefully, and write your safety slogan while waiting for the last four photos next month.



THE QUESTIONS

ANSWER THESE QUESTIONS

1. What is your age and occupation?
2. Do you own an automobile?......................
   What make? .... What year? ....
3. Do you plan to buy a new car?................
   When?.................... What make?...................
4. Approximately how many miles do you travel in your car annually?.......................
5. What brand gasoline do you regularly buy? .... What oil? ....
   What tires? ....

The Name of This Car Is

....

$1000.00 CONTEST!

THE RULES

1 Cut out each photograph and in the space below it write the name of the car from which the identifying feature was taken.

2 DO NOT MAIL YOUR ENTRY UNTIL ALL TWELVE PHOTOGRAPHS HAVE BEEN PUBLISHED.

3 Answer accompanying questions. Your replies to these questions will not be considered by the judges, but to be eligible each entrant MUST answer the questions.

4 In ten words or less state your "SAFETY SLOGAN." The originality shown in the "SAFETY SLOGAN" WILL BE CONSIDERED by the judges. The "Safety Slogans" are to become the sole property of Modern Mechanix Publishing Co.

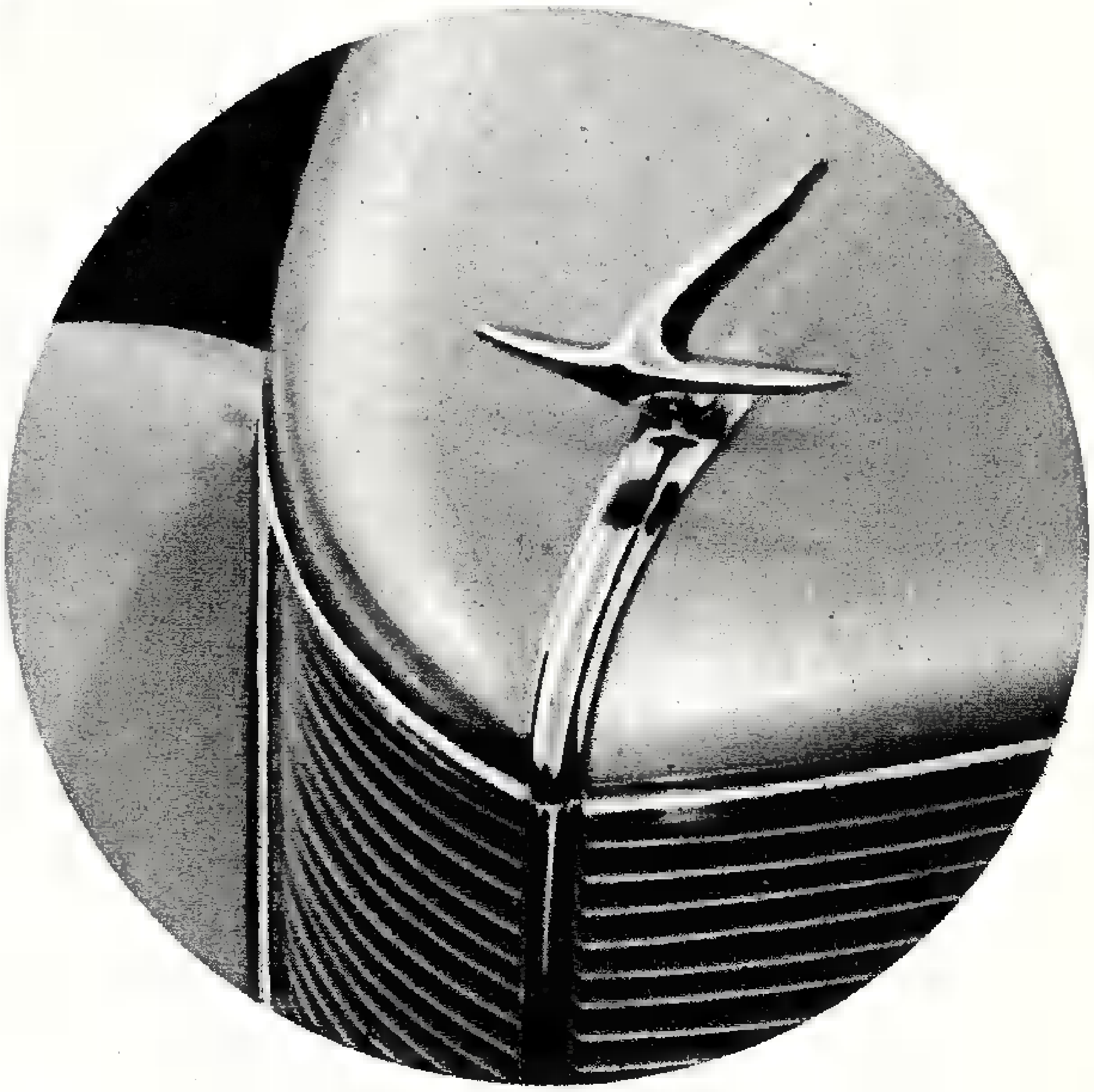
5 This contest is open to everyone except employes of Modern Mechanix Publishing Co.

6 You don't have to buy a copy of this magazine or be a subscriber to enter this contest. Recognizable facsimiles of the photographs will be acceptable.

7 Contestants need not submit elaborate entries. Neatness, brevity, and accuracy will be the deciding factors. No entries will be returned.

8 The editors of this magazine will be the judges. Their decisions are final. In case of ties duplicate prizes will be awarded.

9 Mail your entry to the AUTOMOBILE CONTEST EDITOR, Modern Mechanix Publishing Company, Greenwich, Conn. Write your name and address clearly on your entry. To be eligible entries must be postmarked on or before June 1, 1936. Winners will be announced as soon as possible after the close of the contest.

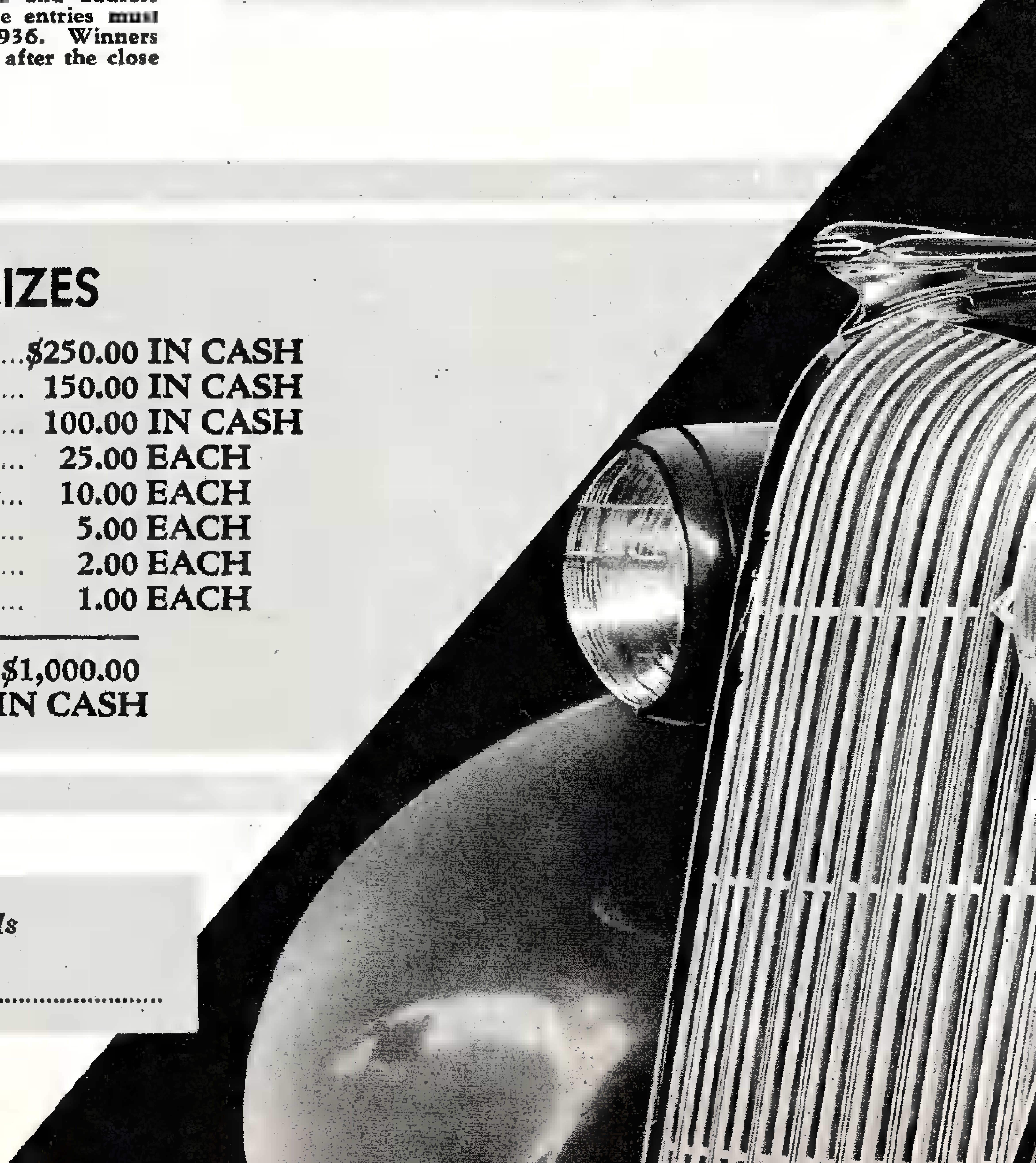


The Name of This Car Is

....

THE PRIZES

First Prize	$250.00 IN CASH
Second Prize	150.00 IN CASH
Third Prize	100.00 IN CASH
5 Fourth Prizes	25.00 EACH
10 Fifth Prizes	10.00 EACH
15 Sixth Prizes	5.00 EACH
50 Seventh Prizes	2.00 EACH
100 Eighth Prizes	1.00 EACH
TOTAL—183 PRIZES	$1,000.00 IN CASH



The Name of This Car Is

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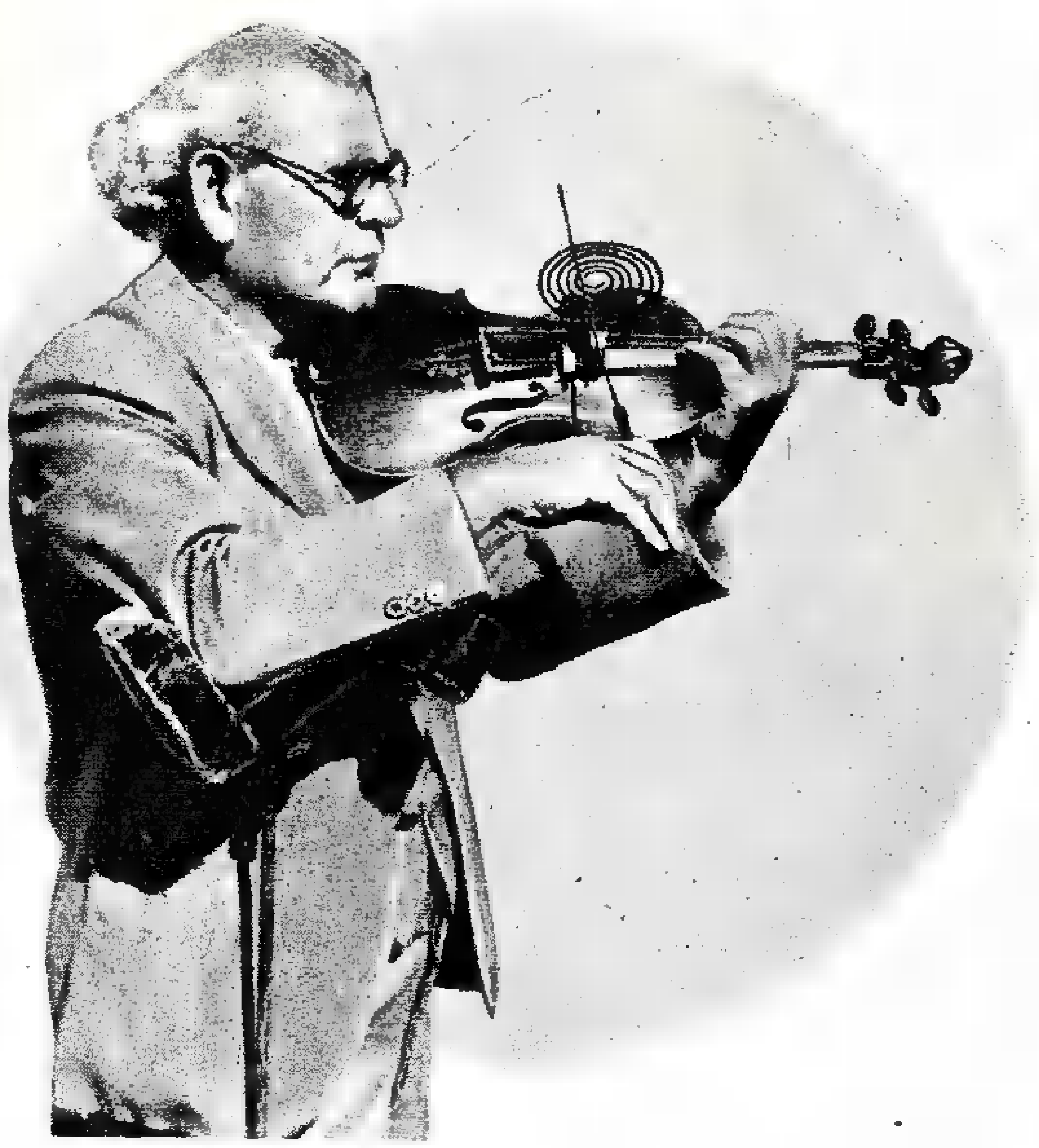
Music Students Aided By Strange Mechanical Gadgets



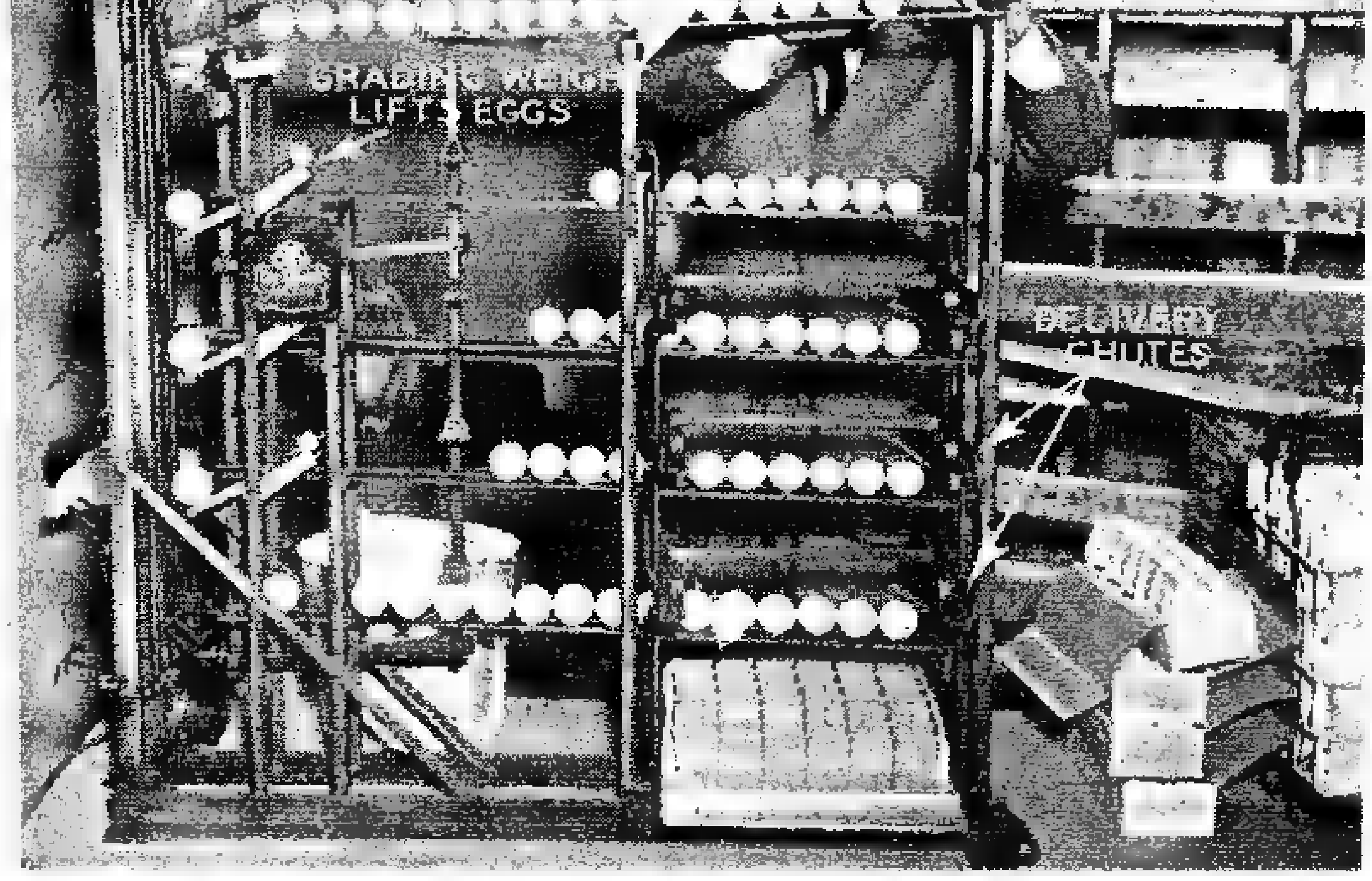
Professor Portnoff of the University of Miami Conservatory of Music demonstrates device for guiding bow across strings and arm rest to hold elbow at proper height while playing.

PROFESSOR Leo Portnoff of the University of Miami Conservatory of Music faculty is the inventor of unusual mechanical devices designed to aid students of stringed instruments to learn technique rapidly. Basing his inventions upon psychology Professor Portnoff claims that they help to establish calm and cool deliberation, poise and dignity, self possession grace and rhythm.

Believing that the real art of music begins where technique leaves off he set about constructing the necessary devices required to aid students in the proper study of music. After much experiment he has succeeded in developing instruments for teaching stroke technique and flexibility of the wrist.

Elevator Grades 1,700 Eggs In Hour

DEMONSTRATED before thousands of New Yorkers who attended the Poultry Producers Council a recently patented egg grader proved itself equal to a human being. Eggs placed in a sloping track at the top of the machine, roll down to an endless conveyor. Adjusted weights pick eggs from the conveyor which are lighter than the weights. Four grades are selected. In one hour the machine can grade and pack 1,700 eggs.



Without breaking a single egg this egg packer and grader is capable of handling up to 1,700 eggs per hour. After dividing them into four grades, eggs are packed in delivery crates.

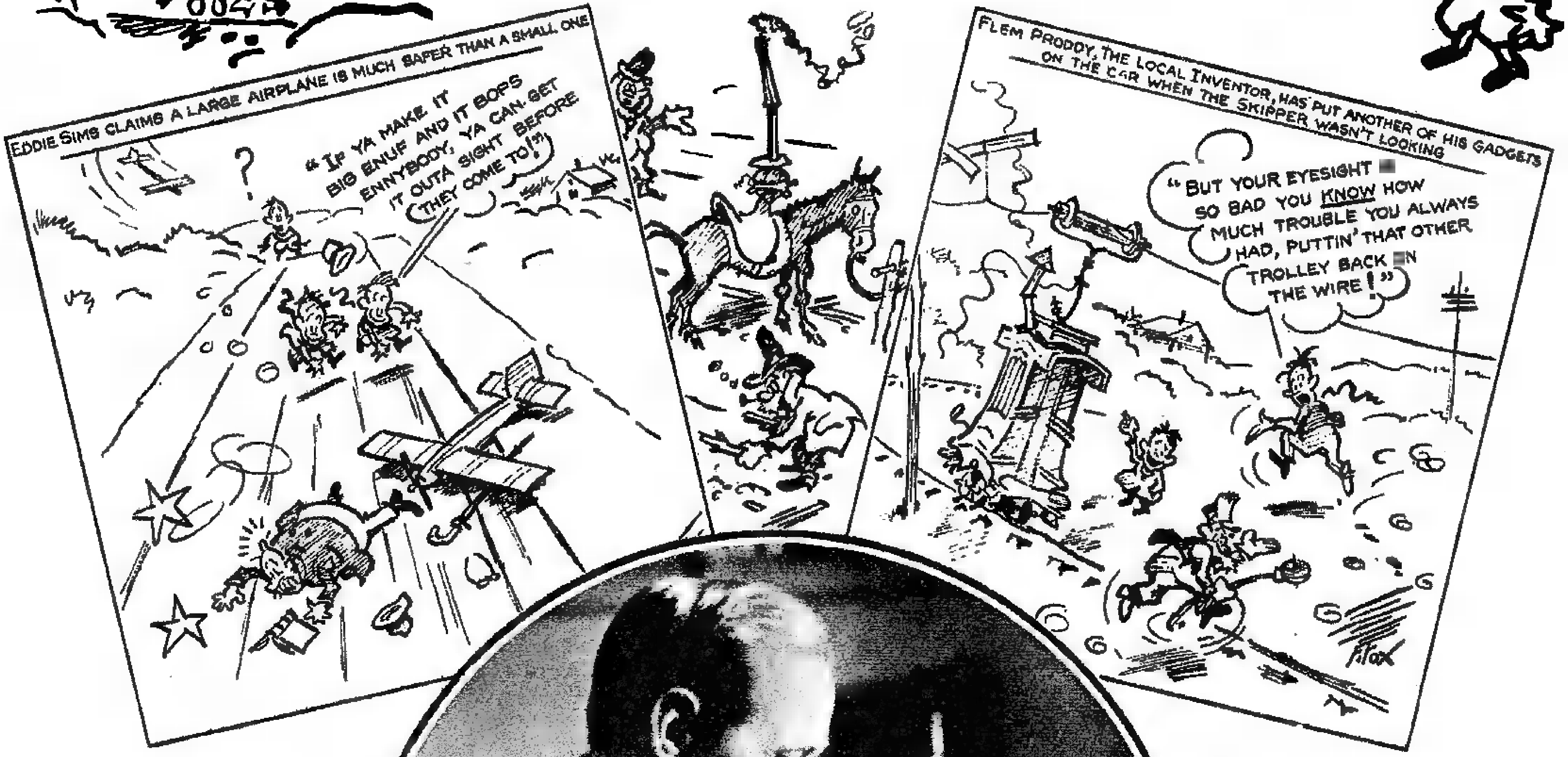
Barney Oldfield Gets Odd License

19 MICHIGAN 36
B O

The famous automobile race driver, Barney Oldfield, wears a broad smile because he has been issued, by the state in which he resides, license plates which bear his own initials.

FAMOUS as American's number one automobile race driver, Barney Oldfield has been assigned automobile license plates bearing his own initials. So pleased was the noted driver with the plates that he immediately attached them to the special car he will use in making a safety campaign tour of the United States. Oldfield is one of the pioneer automobile test drivers who still plays an important part in the automobile world.

Meet Toonerville's Inventor— FONTAINE FOX


EDDIE SIMS CLAIMS A LARGE AIRPLANE IS MUCH SAFER THAN A SMALL ONE
"IF YA MAKE IT BIG ENUF AND IT BOPS ENNYBODY, YA CAN GET IT OUTA SIGHT BEFORE THEY COME TO!"
FLEM PRODDY, THE LOCAL INVENTOR, HAS PUT ANOTHER OF HIS GADGETS ON THE CAR WHEN THE SKIPPER WASN'T LOOKING
"BUT YOUR EYESIGHT IS SO BAD YOU KNOW HOW MUCH TROUBLE YOU ALWAYS HAD, PUTTIN' THAT OTHER TROLLEY BACK ON THE WIRE!"
FOX

The airplane drawn into the cartoon above has its counterpart in all the toy shops of the land. Thus, even the littlest of Toonerville Trolley fans have no difficulty in appreciating the humorous inventions of Mr. Fox. Proving, as would Flem Proddy (cartoon character), that there are many popular inventions which never reach patent office.

The rickety, top-heavy old trolley gallumps its daily way across the insane tracks of the funnies, and you laugh. But Fontaine Fox (left) doesn't. He is concentrating upon more ideas for the coming weeks. It is his inventive mind as well as his drawing ability that keeps him up with best of daily cartoonists.

Cartoons reproduced through courtesy of Bell Syndicate.

THE world lost a great inventor when Fontaine Fox became a cartoonist.

It is true that not a single one of his inventions has ever run, except on paper, and the United States Patent Office would look askance at his contraptions if he tried to patent them, but they bring him fabulous royalties just the same. They also demonstrate that an inventive turn of mind is just as necessary to the successful cartoonist as to the scientific experimenter or basement workshop fan.

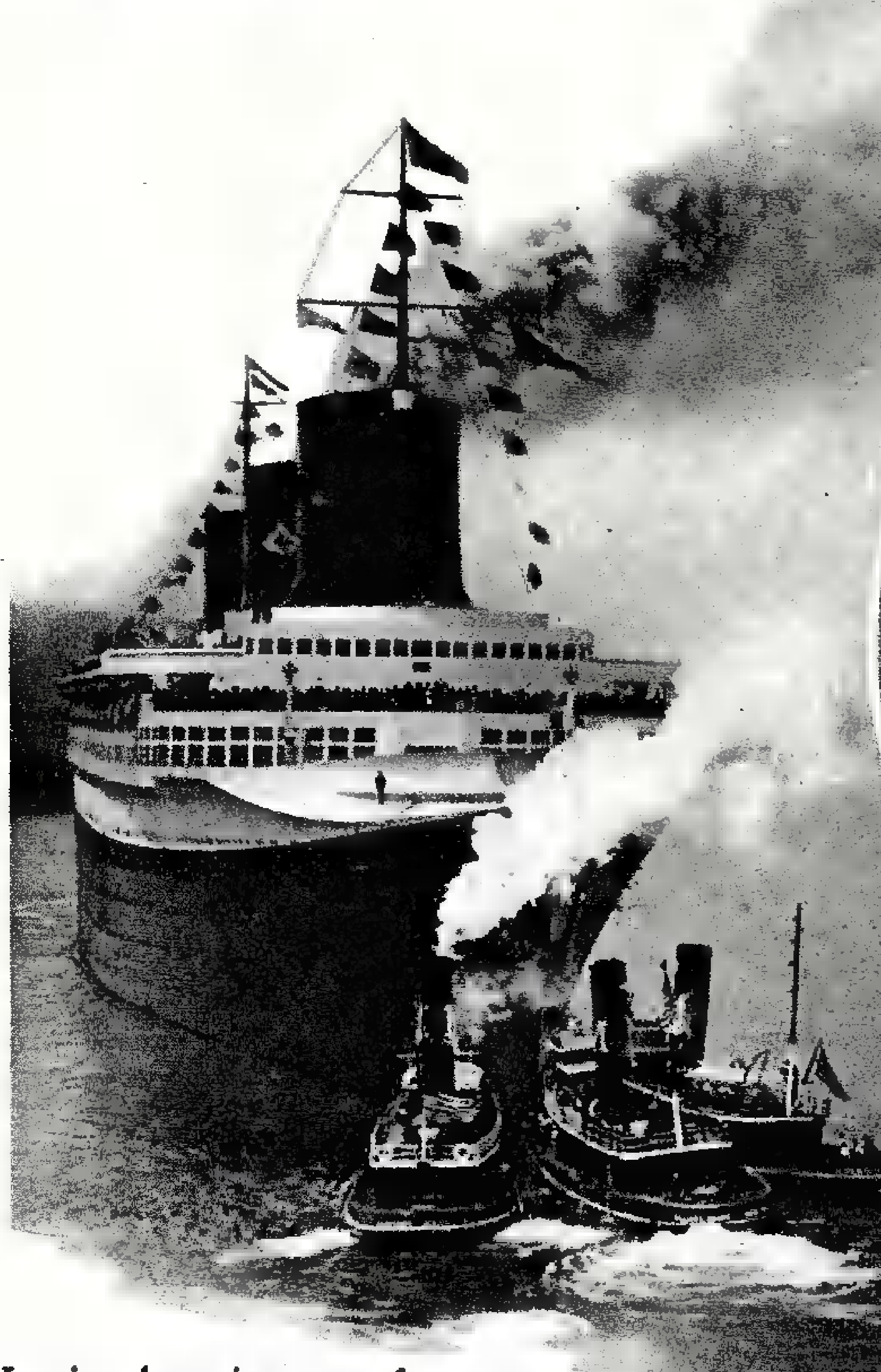
The Toonerville Trolley was invented in 1908 and has been running steadily with capacity laughter loads ever since. It made such an immediate hit that young Fox was forced to invent and populate the entire village of Toonerville.

Flem Proddy is Toonerville's local inventor and his gadgets are all the more amusing *because they should be taken seriously as horrible examples of what not to invent.*

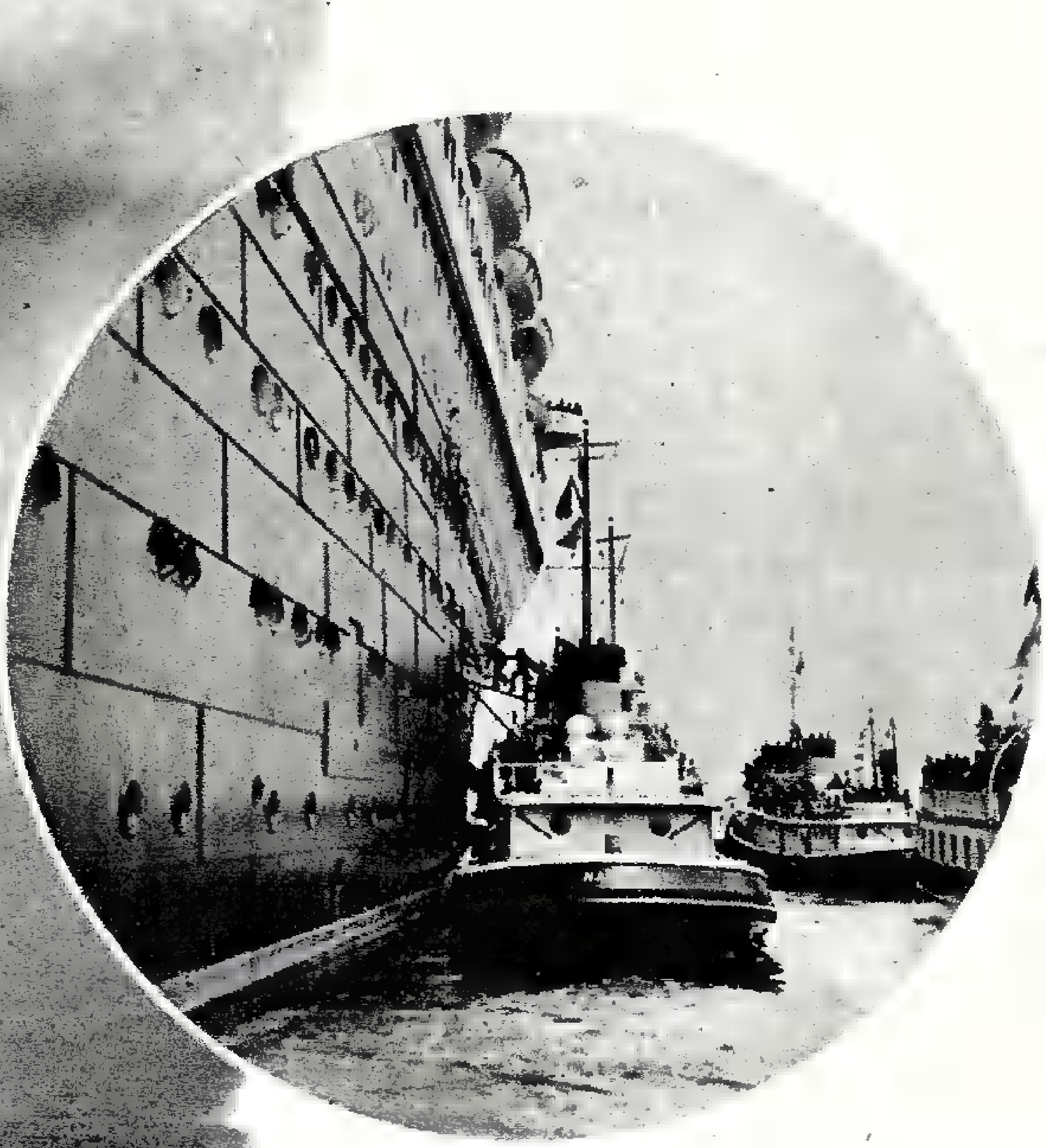
Fontaine Fox's working habits are those of any successful inventor. He doesn't sit around waiting for inspiration. When an idea doesn't come readily, he sits down and patiently figures it out in cold sweat.

The phenomenal popularity of Fontaine Fox over a period of years marks him as one of the greatest cartoonists of all time. Toonerville folks have been as generous with him as he has been with them.

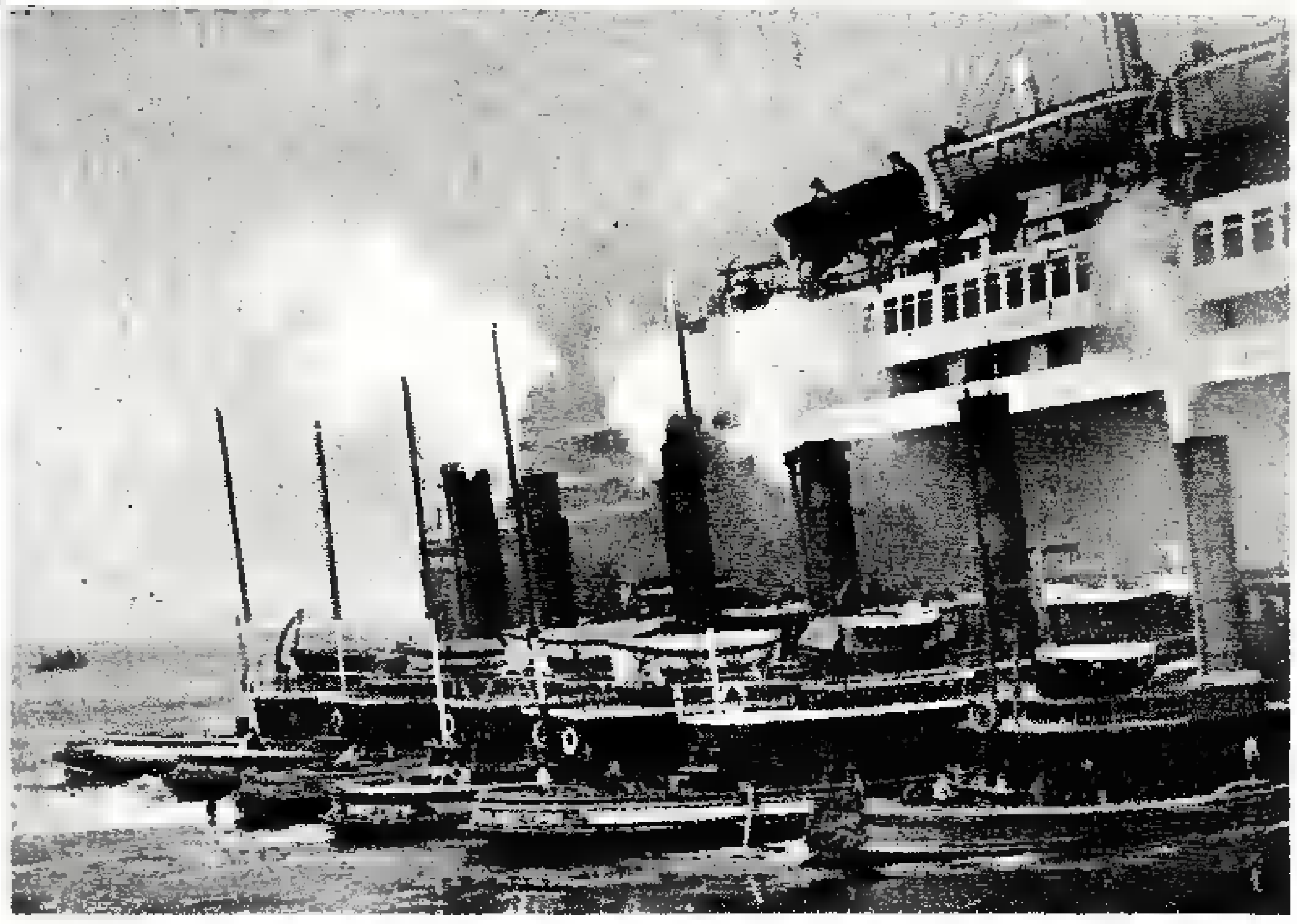
DOCKING the *Normandie* With



Leaving her pier stern first, tugs push a ship back in a great arc, until finally she is headed downstream.



At Quarantine, the tug-fleet's captain transfer to the ship's bridge—to supervise the docking.



Swinging the Europa into her dock requires the work of ten tugs, three of them (above) are working against her bow.

WE WERE off to keep an appointment with a 79,290-ton visitor from across the seas—the giant French liner *Normandie*.

Captain Anton Huseby, master of the tug, Alice M., and the man who was to assume the responsibility of docking the *Normandie* at her Hudson River pier, stood alongside me. Realizing that the captain would soon be too busy to answer my questions, I took the opportunity to ask, "Do you find it more difficult to dock the *Normandie* than the other passenger ships that come into New York?"

He smiled. "Believe it or not," he replied, "but the *Normandie*, for all her size and power, is one of the easiest ships I've handled in the twenty years I've been in the business. Last time she came in we docked her in twenty minutes—fast time for any vessel.

"But docking an ocean liner, or for that matter any ship, can never be done on schedule. It all depends on the tides, the condition of the weather, the amount of harbor traffic and the season of the year. No two jobs are the same. Given a nice summer day, a flood tide and no wind, a ship can be docked in record time. On the other hand, it can be pretty tough if you run into a northwest gale in the middle of winter, an adverse tide and a river packed hard with ice. Night work is difficult, too. Distances are deceiving then and sometimes we're bothered by the glare from the lights on the pier."

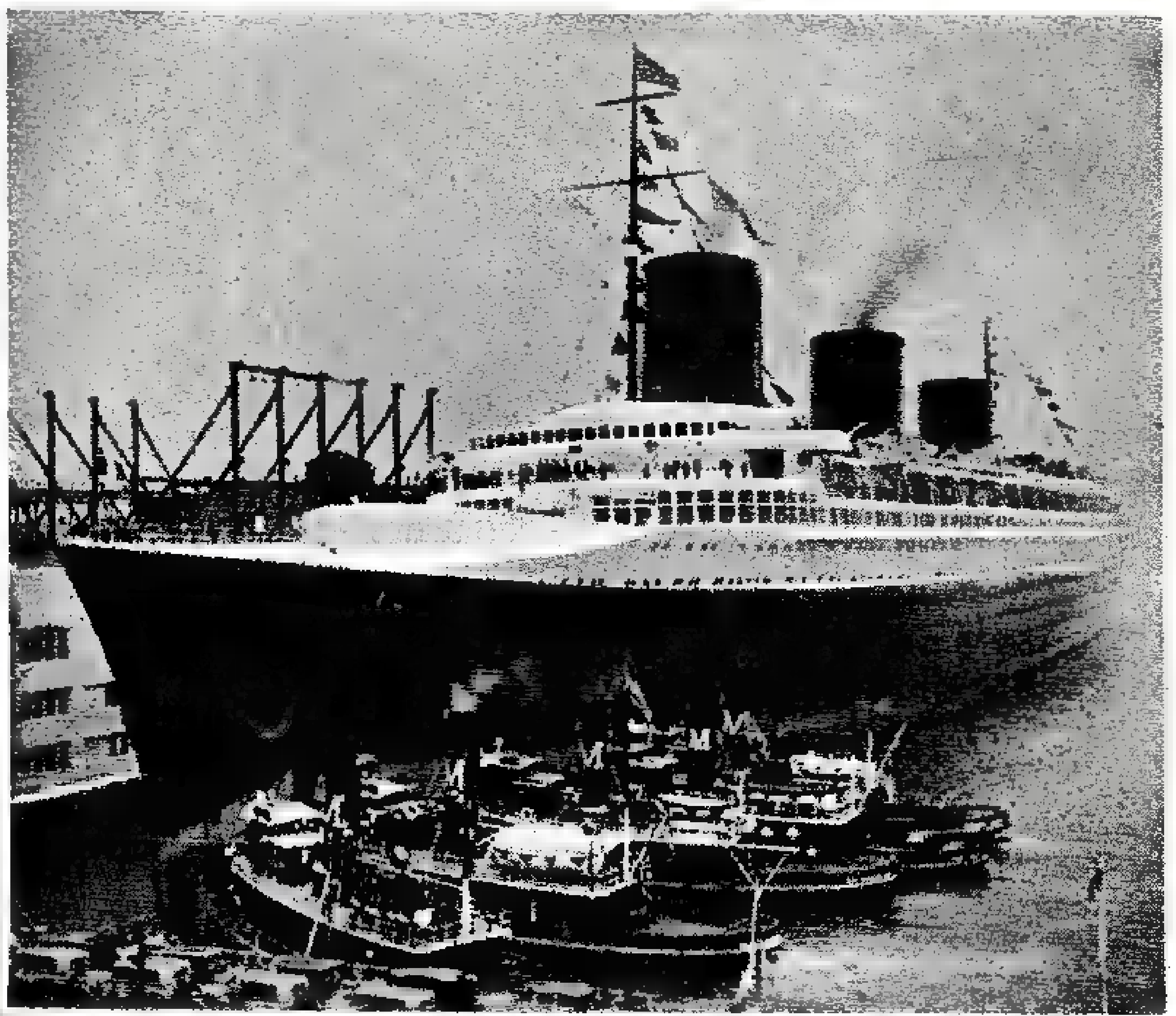
"Then," I said, "there's really no set formula for docking a ship."

"No. Conditions change daily and the only reason we seldom have an accident—is

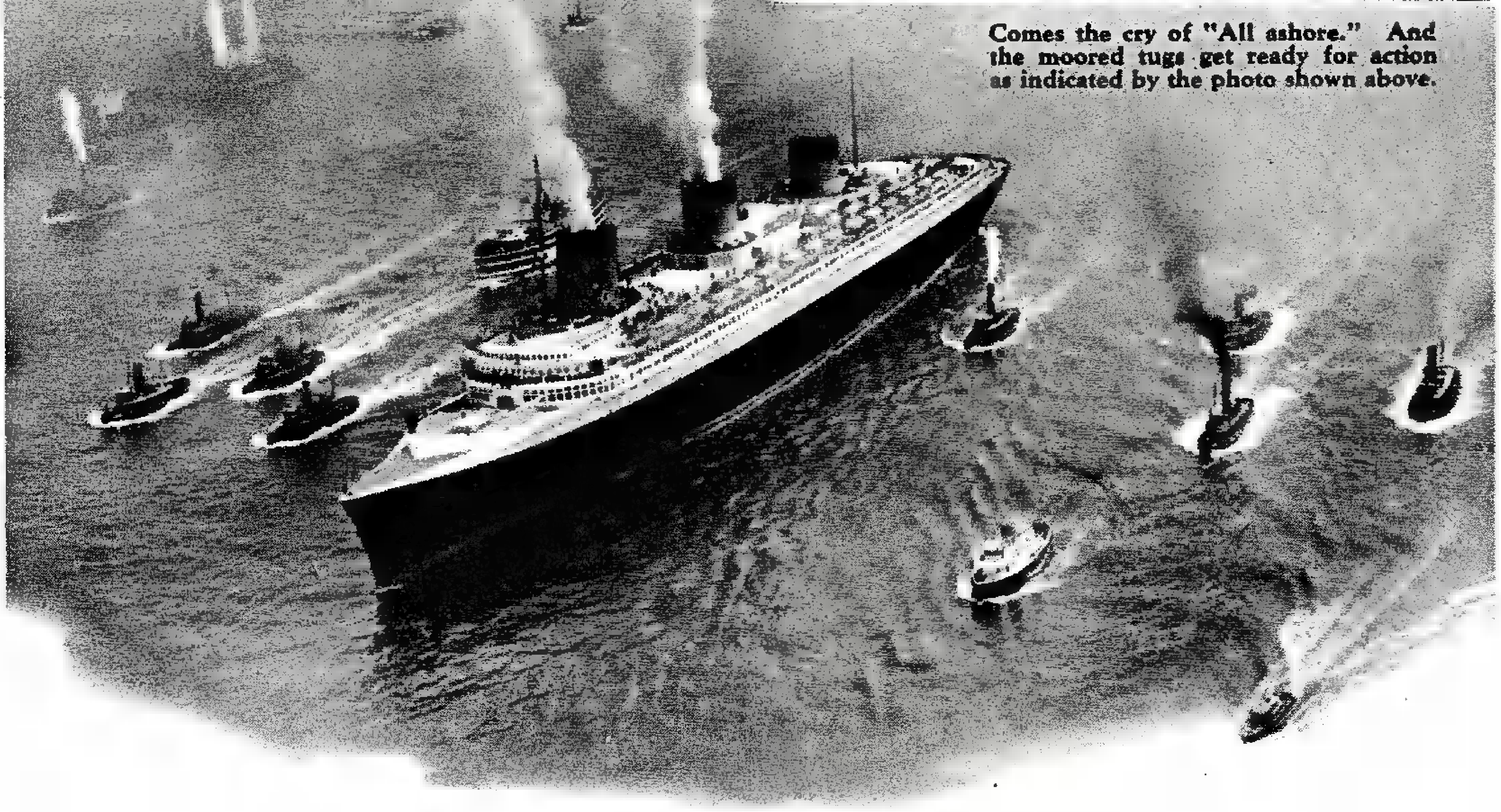
New York's TUG FLEET

by JAMES DYSON

The *Normandie,* for all her great size and power, is one of the easiest of the big ships to handle, claims Anton Huseby, Norwegian captain of the Moran Fleet of New York Harbor tugboats, and the man responsible for docking this great liner. Last time he berthed her in 20 minutes —fast work on any vessel.



Comes the cry of "All ashore." And the moored tugs get ready for action as indicated by the photo shown above.



Carefully guarded from dense river traffic by her convoy of harbor ants, the sea queen steams up the Hudson to her pier.

because we always anticipate trouble. We know from experience exactly what to expect.

"See this police whistle? Well, I use this to signal my directions to the tugs. They acknowledge each signal with blasts from their own whistles—that's why you always hear a chorus of tugboat whistles when a ship is coming in. They all mean something. For instance, one blast means ahead; another single blast, stop; two blasts, reverse engines, and three or four quick blasts, push in and give her all you've got! We'll have eight tugs on today's job."

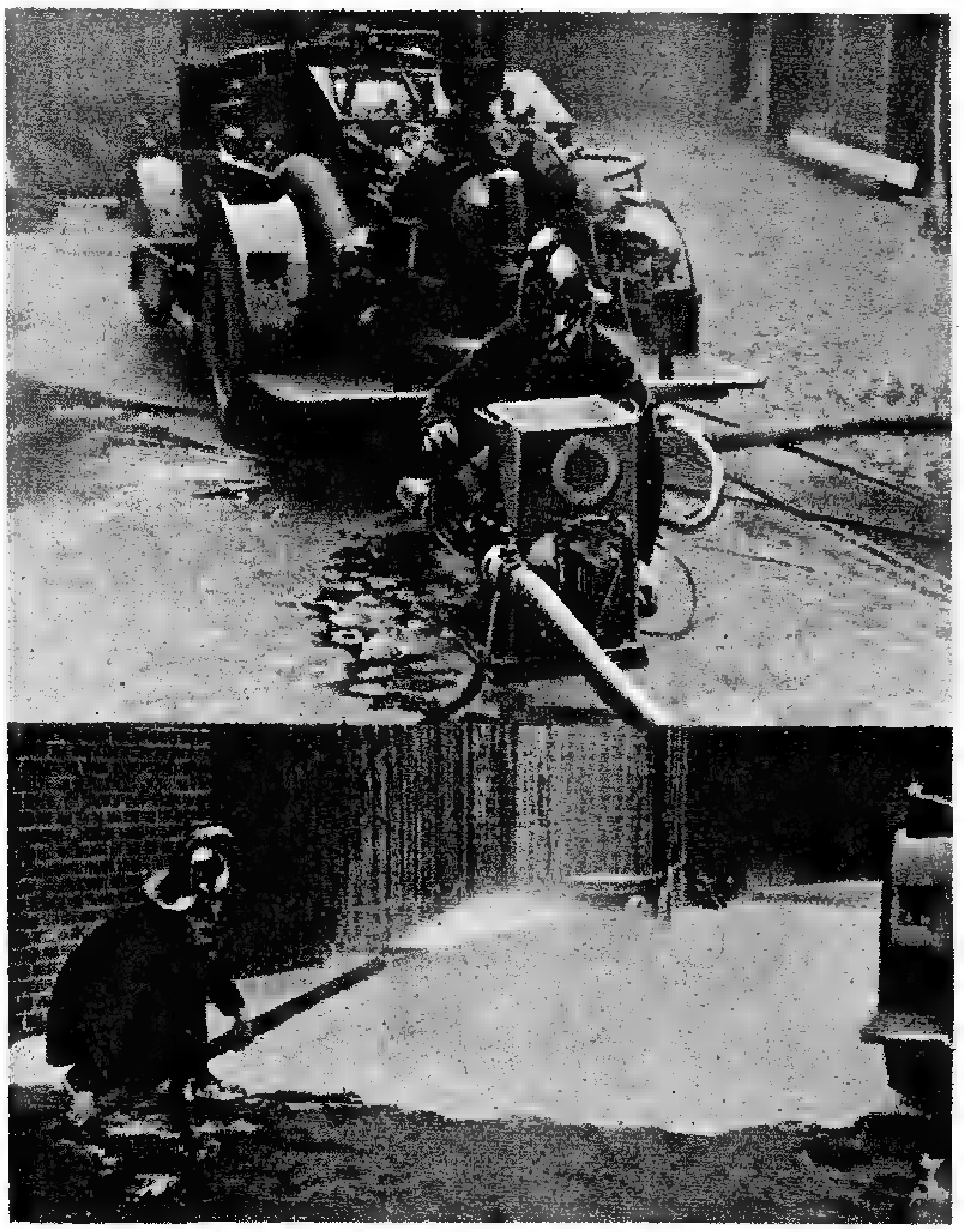
"How do you determine the number of tugs?" I inquired.

"There again it depends on the conditions," he answered. "When the *Normandie* first came over we used twelve boats, but I've docked her with only six. We usually use ten tugs for the Majestic, Berengaria, Bremen and Europa and about eight for the Aquitania and other ships of her size. But I can remember one tough day in the middle of winter when we had fourteen tugs on the Bremen and it took three hours to dock her.

All this was explained to me as we moved along towards the French Line pier. The *Normandie* had by this time cleared Quaran-

[*Continued on page* 120]

Automobile Exhaust Fumes Help Fight Stubborn Blazes



Requiring but a fraction of the space needed for similar devices this foam generator is operated by the exhaust of the fire engine. Firemen here demonstrate its effectiveness.

USING the exhaust fumes from the motor of the fire apparatus a small foam generator recently tested near London proved highly practical in putting out chemical and oil blazes. The generator is light enough to be transported by two men and requires very little space. To place in operation the generator is filled with liquid chemicals and a length of metal tubing is connected between it and the exhaust pipe of the fire engine. The fluid passes through a glass chamber where it mixes with the gas and then is pumped, by a small electric motor, to the scene of the blaze.

The inventors of the device claim that by using exhaust gas the cost over the usual methods is cut by 90 per cent.

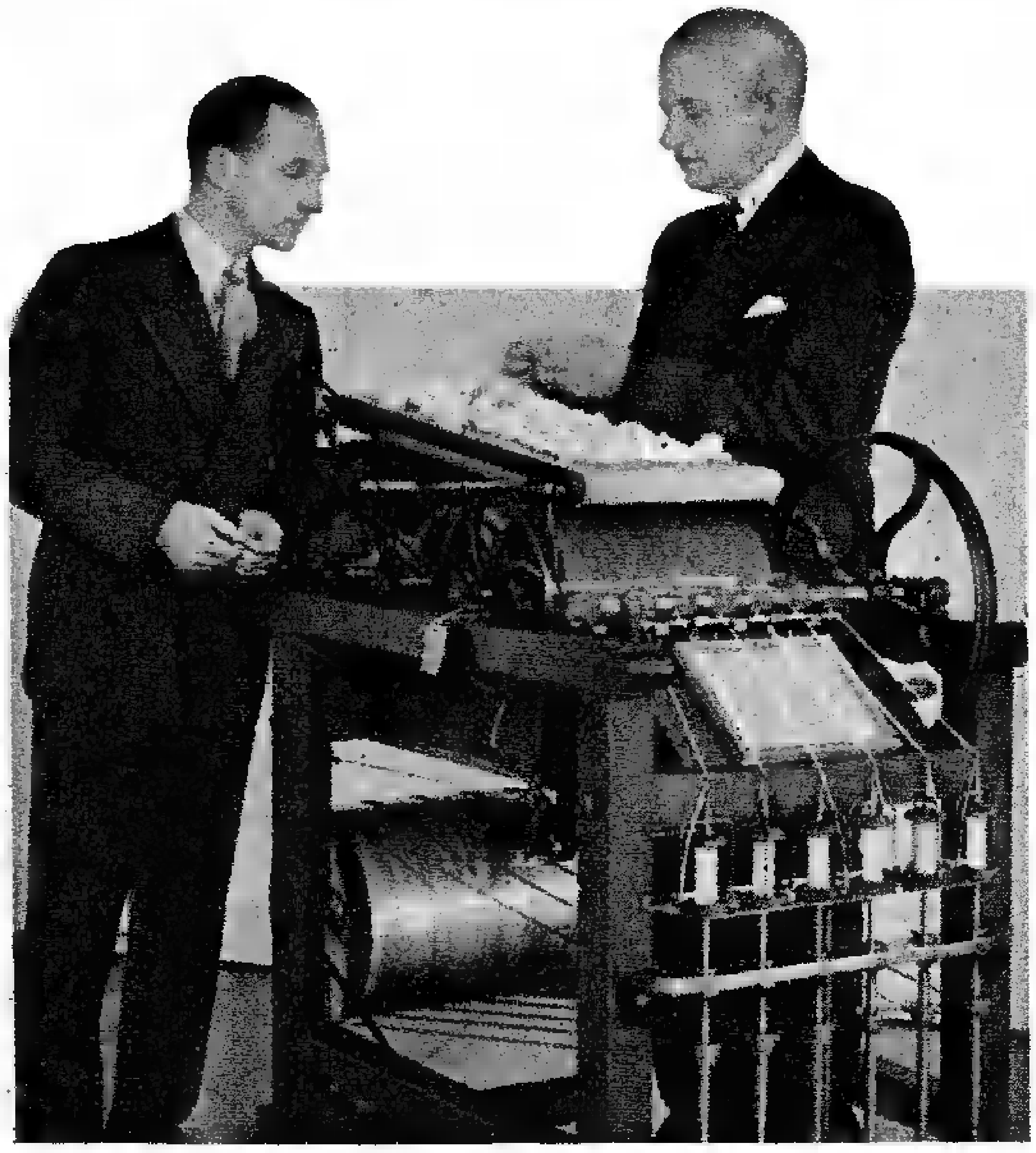
Auto Driven To Western-Most U. S.

LOCATED at the northwestern tip of the State of Washington is the most westerly part of continental United States that can be reached by automobile.

From this point the distance to China is almost 6,000 miles, all the distance being across open sea. It is possible to reach this unique spot by motor car from Seattle in several hours driving time over modern paved highways.

This bleak spot located in the northwestern corner of the state of Washington is the most westerly part of the United States. From this point it is 5,996 miles to the shore of China.

Ancient Yarn Spinner Runs Again



Examining closely the work of this one hundred-year-old cotton spinner are Edsel Ford and Nathan Adams of the Texas Centennial. The spinner is from the Ford Industrial Museum.

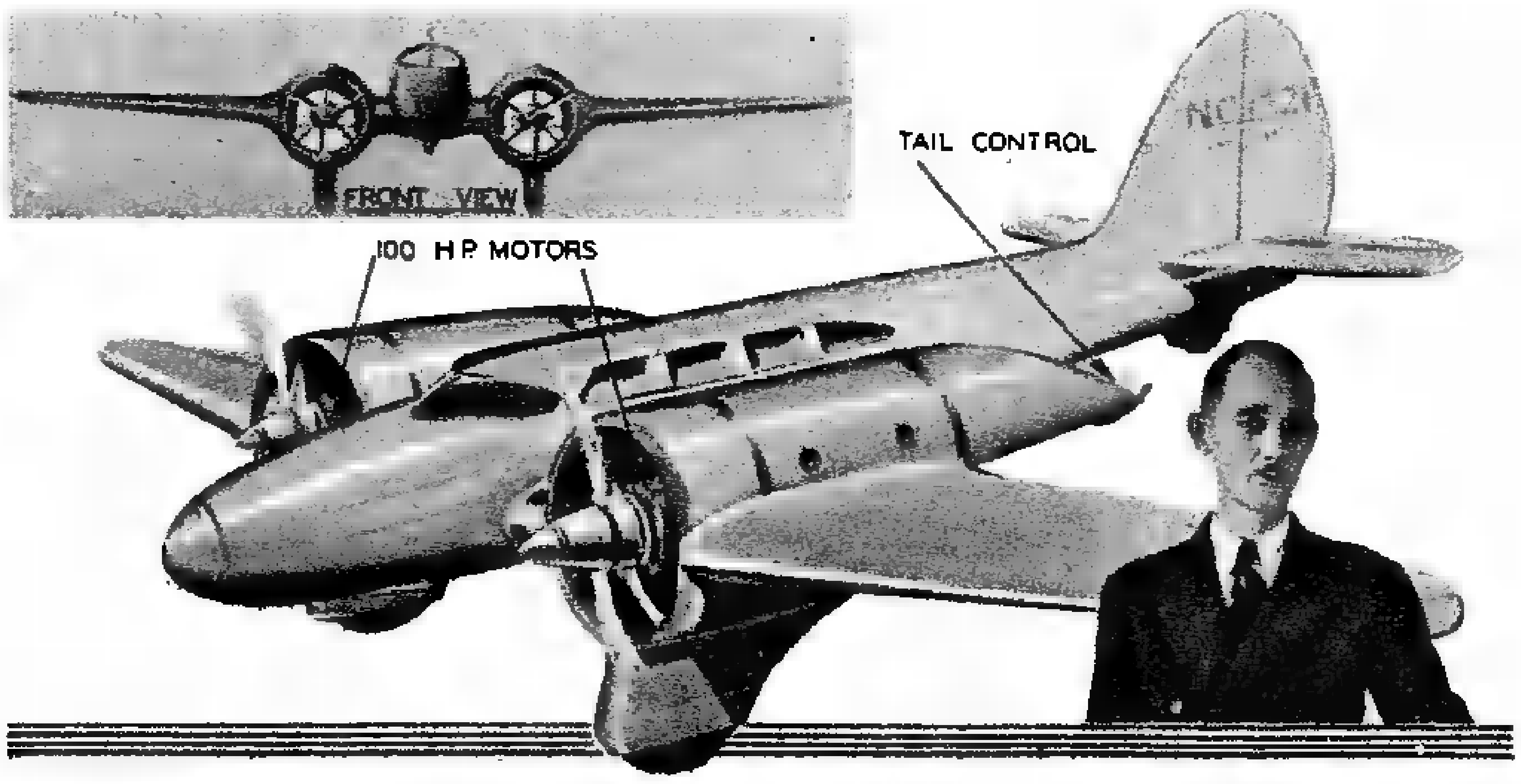
A COTTON spinning machine that saw service on a southern plantation more than one hundred years ago will be one of the interesting exhibits to be seen at the coming Texas Centennial Exposition to be held at Dallas.

The ancient machine is one of the many from the collection of Henry Ford that will describe to visitors the advancement made during the last century by the various industries in the Lone Star State.

Mechanical Tornadoes Power Odd Barrel Plane

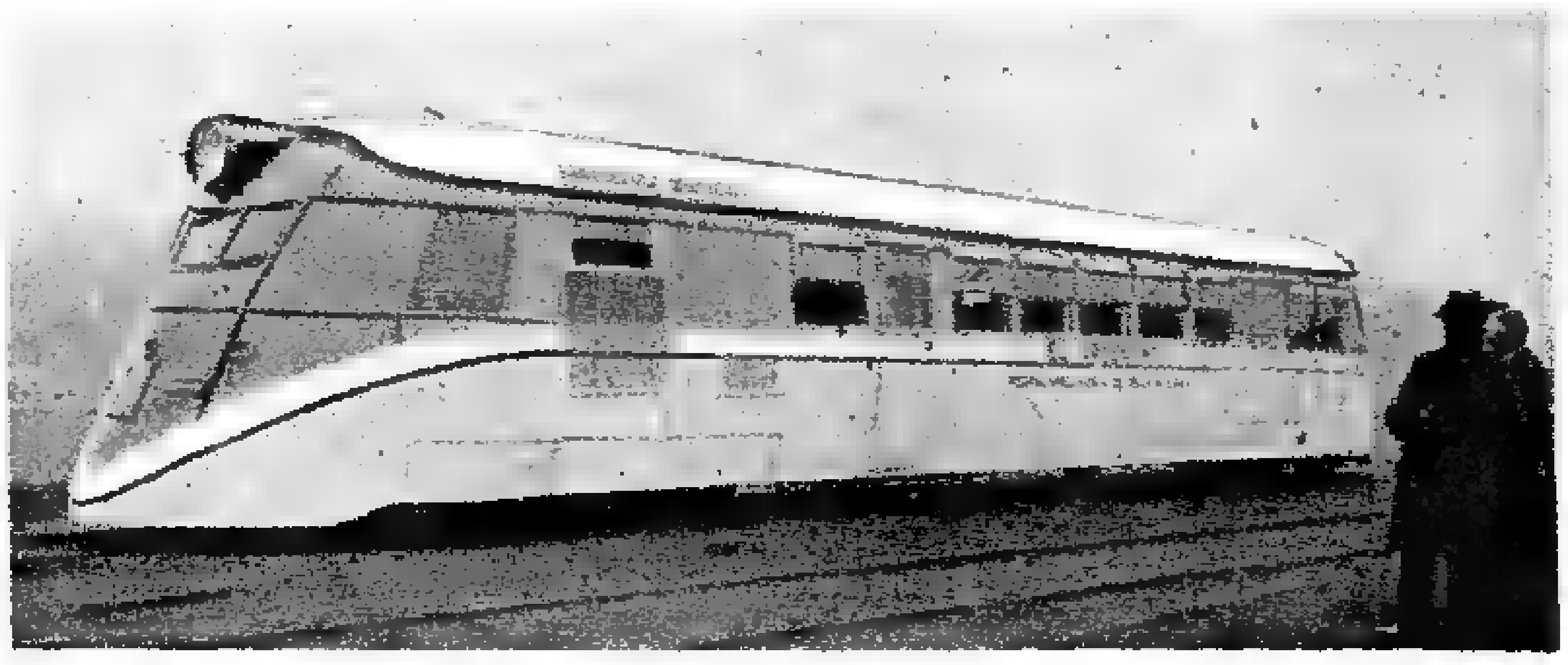
A WISP of cigarette smoke blown through a little cylinder led Ralph K. Odor, of the Oklahoma A. and M. College, to design an unusual airplane that may revolutionize present aircraft design. The plane, according to its inventor, will be powered by two engines each one mounted before a barrel-like wing structure so as to drive the wind through the tubes in the same manner as a tornado "twister."

In experiments made on models the wind tunnel tests showed a zero "drag" indicating that in full scale the plane should attain great speeds with little resistance. Mr. Odor's first plane is to be constructed of steel reinforced fabric. It will have a wing spread of 35-feet, measure 24-feet in length and 8-feet in heighth. Provision will be made for carrying a pilot and four passengers with ease. Two specially designed 100-horsepower motors will supply the motive power.



Different in both operation and design is this strange barrel airplane. Its inventor, Ralph K. Odor, shown above, claims that it will fly higher and faster than any other planes. The ship required seven years to design.

Diesels Speed Travel In Argentina



Featuring luxurious appointments and capable of attaining high speeds this modern rail car is one of a fleet soon to be placed in service on the railroads of eastern Argentina.

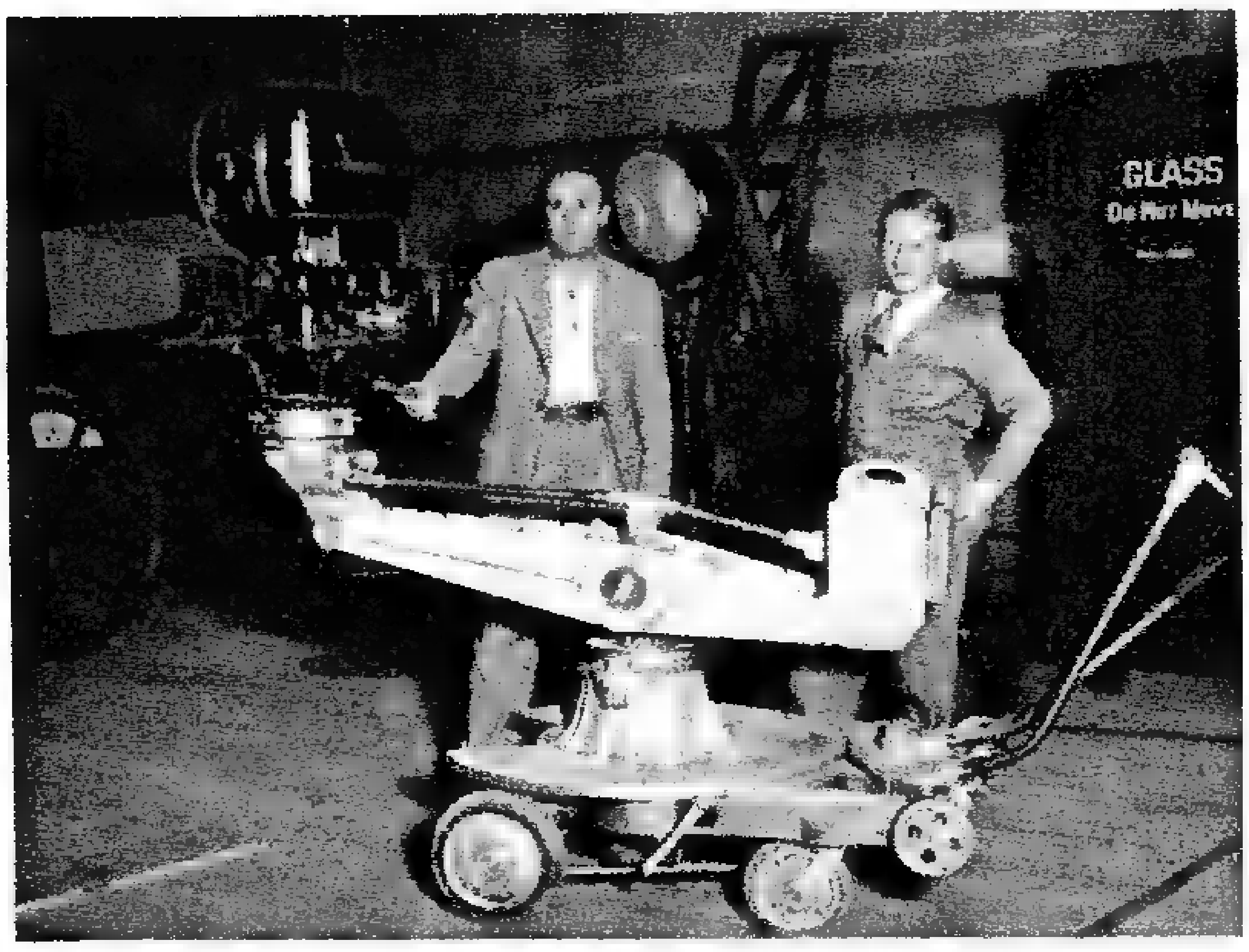
IN ORDER that they might keep abreast with the rest of the world the Argentina Railways have contracted with a British locomotive works to have built a fleet of high speed diesel cars. The new coaches will be very similar to those now in use in the United States and will feature reversible seats and other luxurious appointments. Due to the limited facilities in South America the cars will all have dual operating controls so that they may be used where no turn-tables exist.

The manufacturer of the streamlined rail cars claims that not only will high speeds be possible, but that the trains may be operated at very low cost. In experimental runs tests showed that it was possible to run the cars nine miles on one gallon of oil.

Rolling Tripod Aids Movie Making

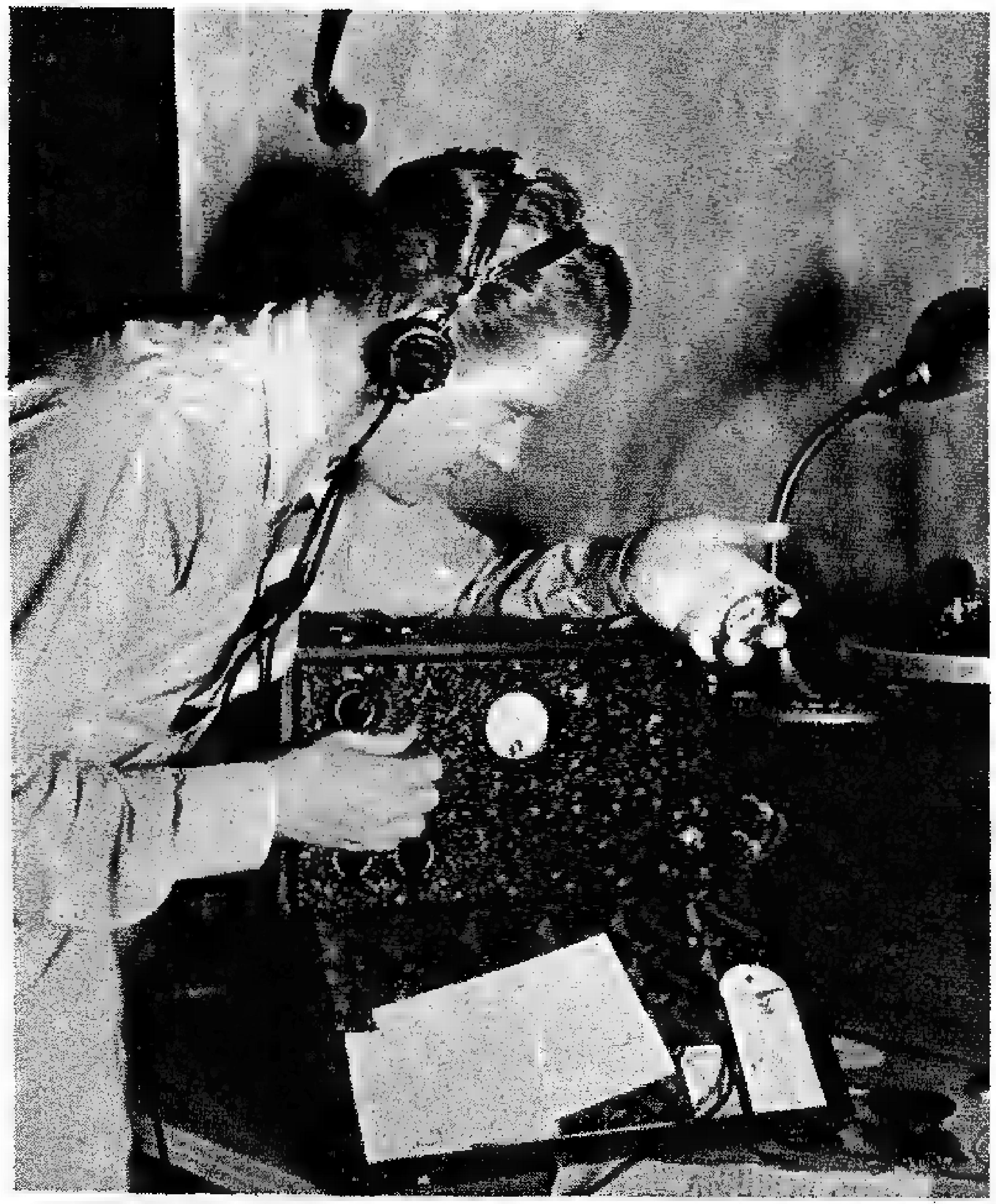
IN TAKING difficult scenes moving picture directors at a Hollywood studio found that with their usual camera tripods it was impossible to get effective camera angles without an unusual amount of experimental shots. Members of the studio's technical staff were assigned the job of constructing a tripod that would meet the requirements of the producers although their task seemed impossible.

After weeks of experimenting the technicians announced that they had completed a tripod which would meet the producers' demands. The result was a rubber tired dolly on which was mounted a camera crane that could be adjusted in a few moments to any angle. The tripod can be elevated from one to seven feet and will swing completely around. A lever permits the camera to be set at any degree thus doing away with the former complicated methods.

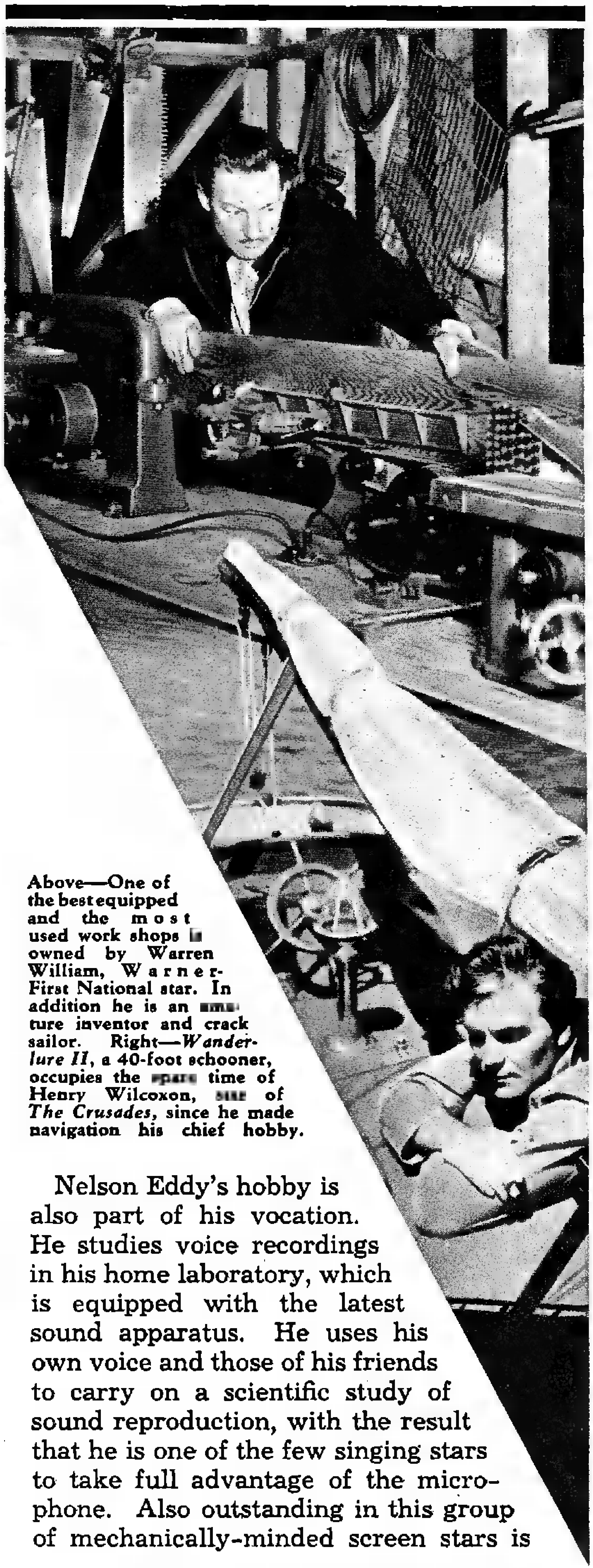


To permit cameras to move about at various angles during the filming of motion pictures this combination dolly and crane was invented by technicians of a leading California studio.

When Hollywood STARS



To Nelson Eddy, singing star of *Naughty Marietta* and *Rose Marie* there is no mystery in sound reproduction, for he has made that science his hobby. His home laboratory is filled with sound apparatus with which he is always experimenting.



Above—One of the best equipped and the most used work shops is owned by Warren William, Warner-First National star. In addition he is an amateur inventor and crack sailor. Right—*Wanderlure II*, a 40-foot schooner, occupies the spare time of Henry Wilcoxon, star of *The Crusades*, since he made navigation his chief hobby.

WHILE their images are engaged in entertaining millions of people in theaters all over the world, Hollywood stars can be found entertaining themselves—in their workshops. And while their images flash across the screen, garbed in sophisticated evening apparel, gay costumes of former periods, or flashy uniforms, the stars are hard at work in grease stained coveralls, dungarees and sweat shirts, or the first old garments to come to hand.

Hobbies in Hollywood are not a fad. They represent years of study and hard work, and when an actor speaks of his particular interest, he speaks with authority. Contrary to popular belief, the lure of the night clubs and bright spots is dwarfed by the compelling interest the stars show in their hobbies.

Wallace Beery is the most famous flier in Hollywood. When not before the cameras he is either up in his six-passenger Bellanca plane testing out new devices, or poring over maps and technical literature on flying at his airport. After aviation comes fishing, and then amateur photography.

Nelson Eddy's hobby is also part of his vocation. He studies voice recordings in his home laboratory, which is equipped with the latest sound apparatus. He uses his own voice and those of his friends to carry on a scientific study of sound reproduction, with the result that he is one of the few singing stars to take full advantage of the microphone. Also outstanding in this group of mechanically-minded screen stars is

TURN *To* HOBBIES

By HOWARD SHARPE

Above — Clark Gable, hero of a score of screen classics, mixes photography with his two other hobbies, fishing and hunting. He often joins Beery on an aerial jaunt to some favorite fishing grounds. Left—The undisputed ace pilot of Hollywood is Wallace Beery. Aviation in all its technical phases is his particular hobby.

Most of Hollywood's actresses are experts in interior decorating, but Maureen O'Sullivan uses her modeling hobby to make her own objects of art. She is an expert in clay figures.

Alan Hale, whose flair is for things scientific. Of his many inventions three are deserving of mention because of their value to the modern world: His new "Tellurian," his perfected "Aerobot," and his improved eye-glasses.

The "Tellurian" was conceived by Sir Isaac Newton a century ago, in the hope it would demonstrate the effect of various planets upon life and conditions on the earth. It was finally built by Hale and Merrill Hard, partners in an experimental and research laboratory. The instrument so simplifies the study of astrological bodies that a twelve-year-old boy, after four half-hour lessons, is enabled to pass a "Teacher's Normal" examination which usually requires four years of study.

Hale's perfected "Aerobot" is capable of controlling the plane's speed, altitude and flight direction while the pilot devotes his time to charting or listening to the radio.

Many of the Hollywood great have turned to boats for their hobbies. Warren William considers it no great accomplishment to handle his 30-foot sloop, *Common Sense* single handed in a strong wind. Henry Wilcoxon is another to prefer the graceful close-to-the-water sweep of a sail-boat, while "Tarzan" Weissmuller has a 48-foot yacht powered by two Diesel motors. Even Sir Guy Standing, whose real mechanical hobby is an automobile trailer, occasionally finds time to tinker with the engine of his small motor-boat.

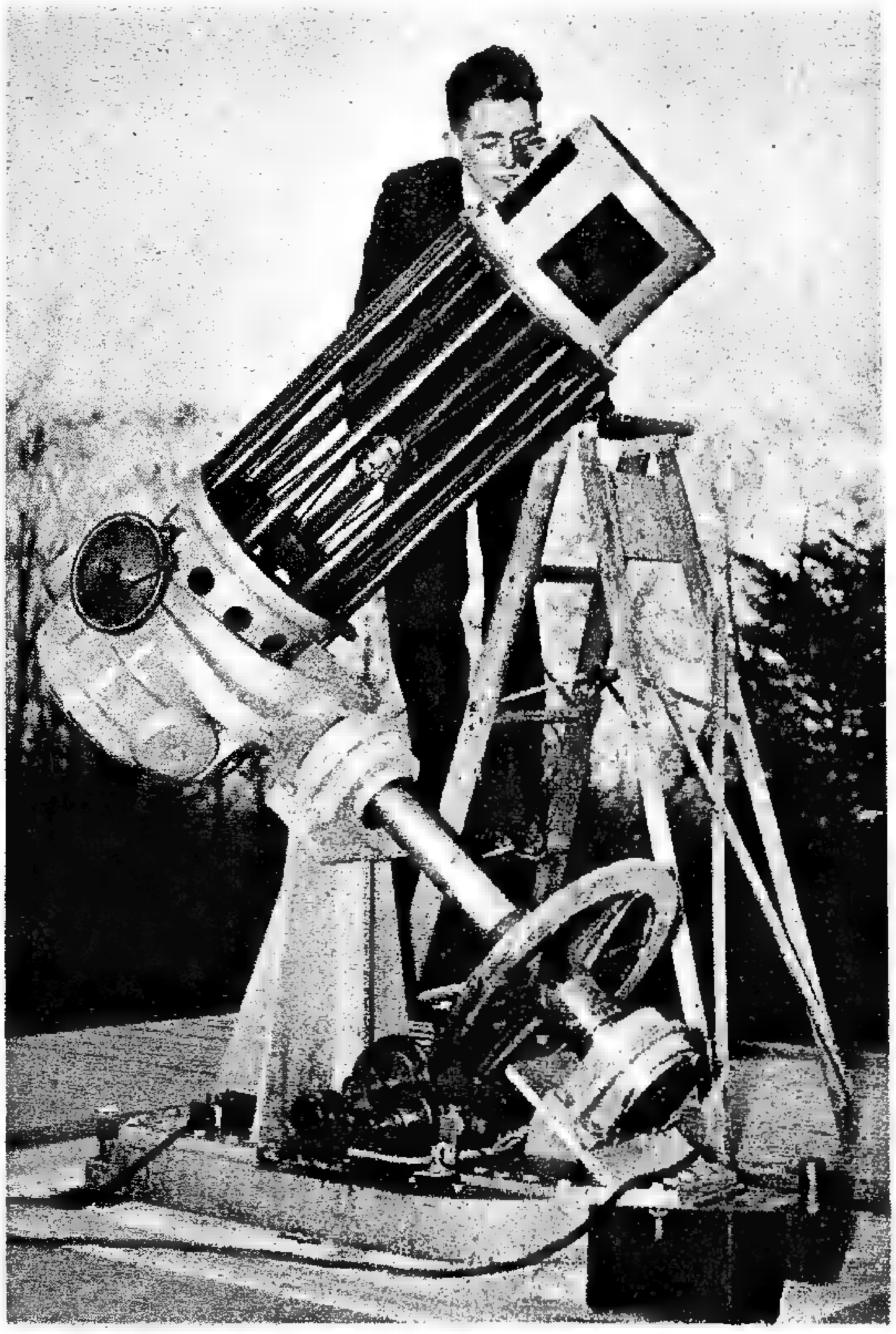
Sir Guy's trailer is roomy with a door built into the side, and contains all the requisite

[*Continued on page* 122]

Youth Builds Telescope; Equals Professional Models

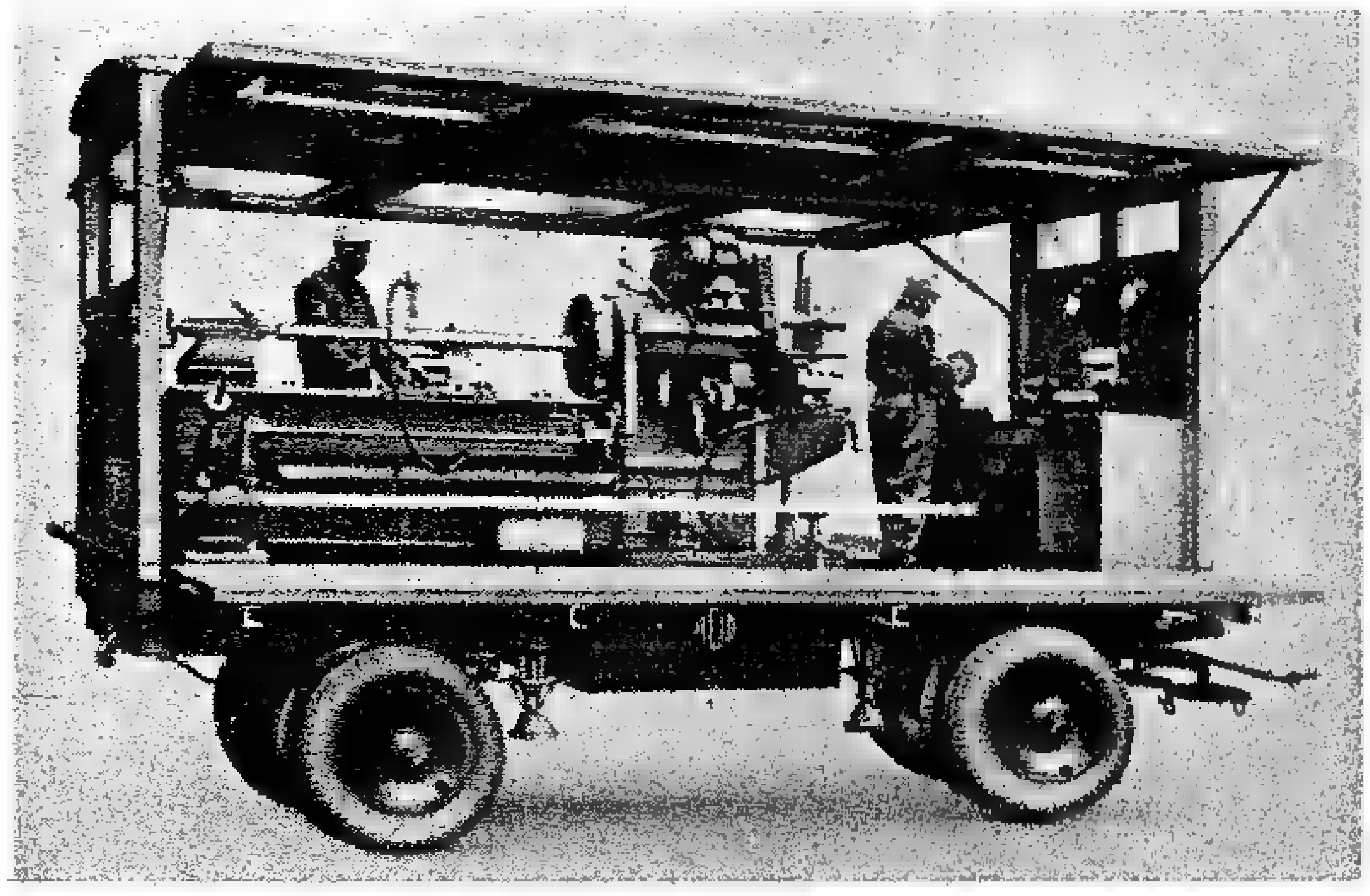
DETERMINED to gain admittance to West Point Alan Gee, a 19-year-old Washington, D. C., youth, is studying advance astronomy on an elaborate telescope designed by himself. The instrument, powered by an electric driven mechanism, may be used as a Newtonian reflector type or a Cassigrain, both having unusual range.

Young Gee, not content with the usual telescopes used for amateur purposes, decided that his instrument would not follow the design of the more common ones. The result was a device superior to many commercial types used by college science departments.



Equalling the professional astronomer's instrument is this unique telescope designed by Alan Gee a 19-year-old youth who expects to enter West Point through his advanced study.

Shop Travels to Scene of Work



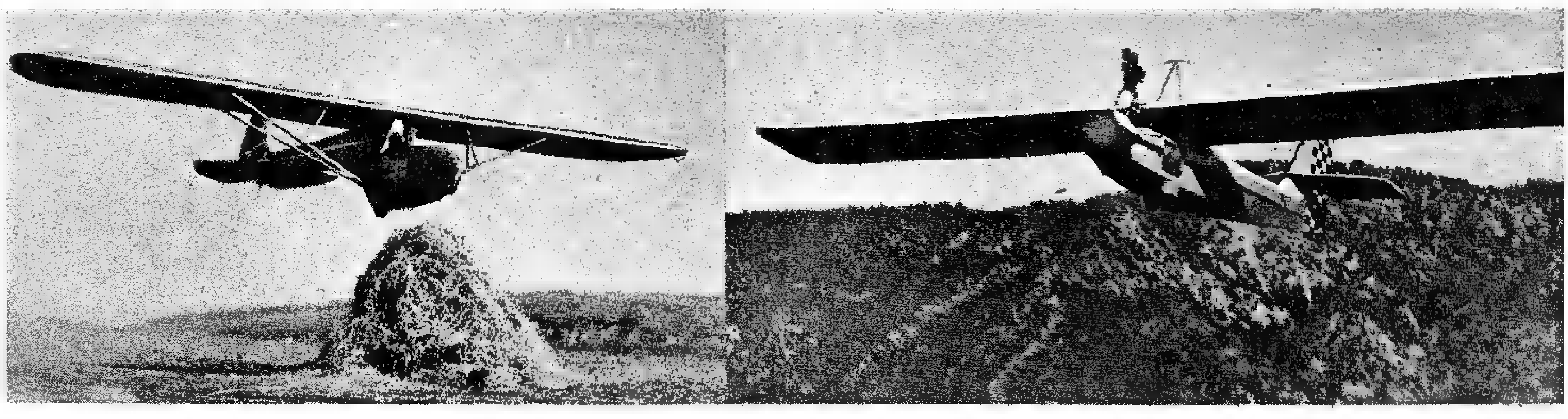
In order to reduce construction costs this trailer machine shop can be transported to the actual scene of construction. It contains all the machines found in the average shop.

DESIGNED in the form of an automobile trailer a German manufacturer has placed on the market a portable machine shop which may be towed to the scene of construction by a motor truck. The trailer contains metal turning lathes, grinders, shapers and workbench. A Diesel-electric engine supplies the power for operating the various tools.

Movie Gliders Break Flying Records

WHILE appearing in a moving picture short filmed from the palisades adjoining the Pacific Ocean in Southern California "Speed" Westphal, national glider champion, unintentionally broke the west coast record for utility gliders.

During one of the scenes the plane caught a perfect wind and glided fourteen miles before coming to earth. The craft which made the record-breaking flight was designed by a studio writer, Gus Briegleb.

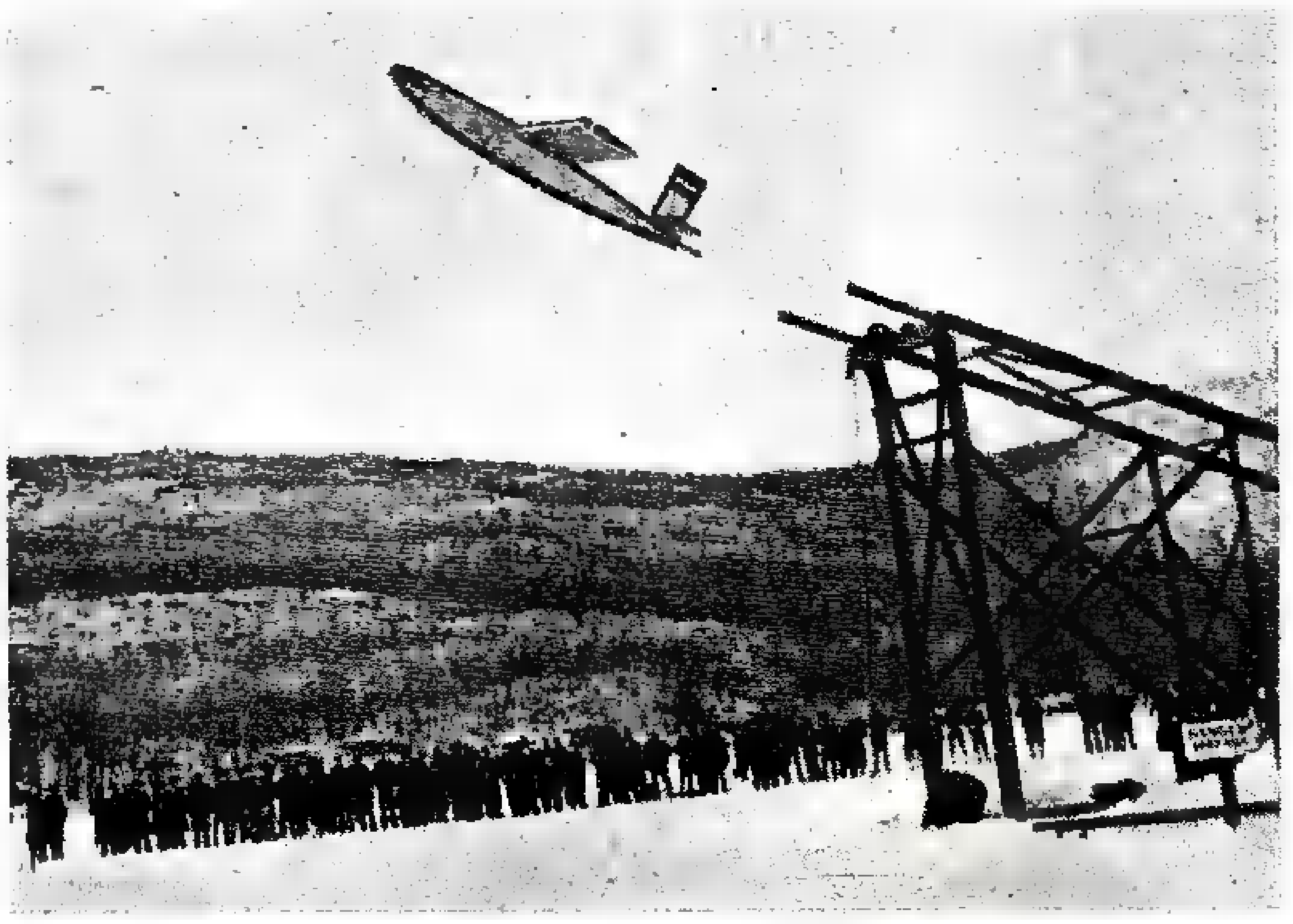


While appearing in a new motion picture "Speed" Westphal, America's leading glider pilot, set a new record for the west coast by sailing the glider, shown at right, 11 miles in 20 minutes. Another of the motorless planes is shown sailing over a haystack while nearby moving picture cameras grind. This plane furnished many breathtaking thrills from the Pacific palisades.

Mail Carried One-Quarter Mile By Model Rocket Plane

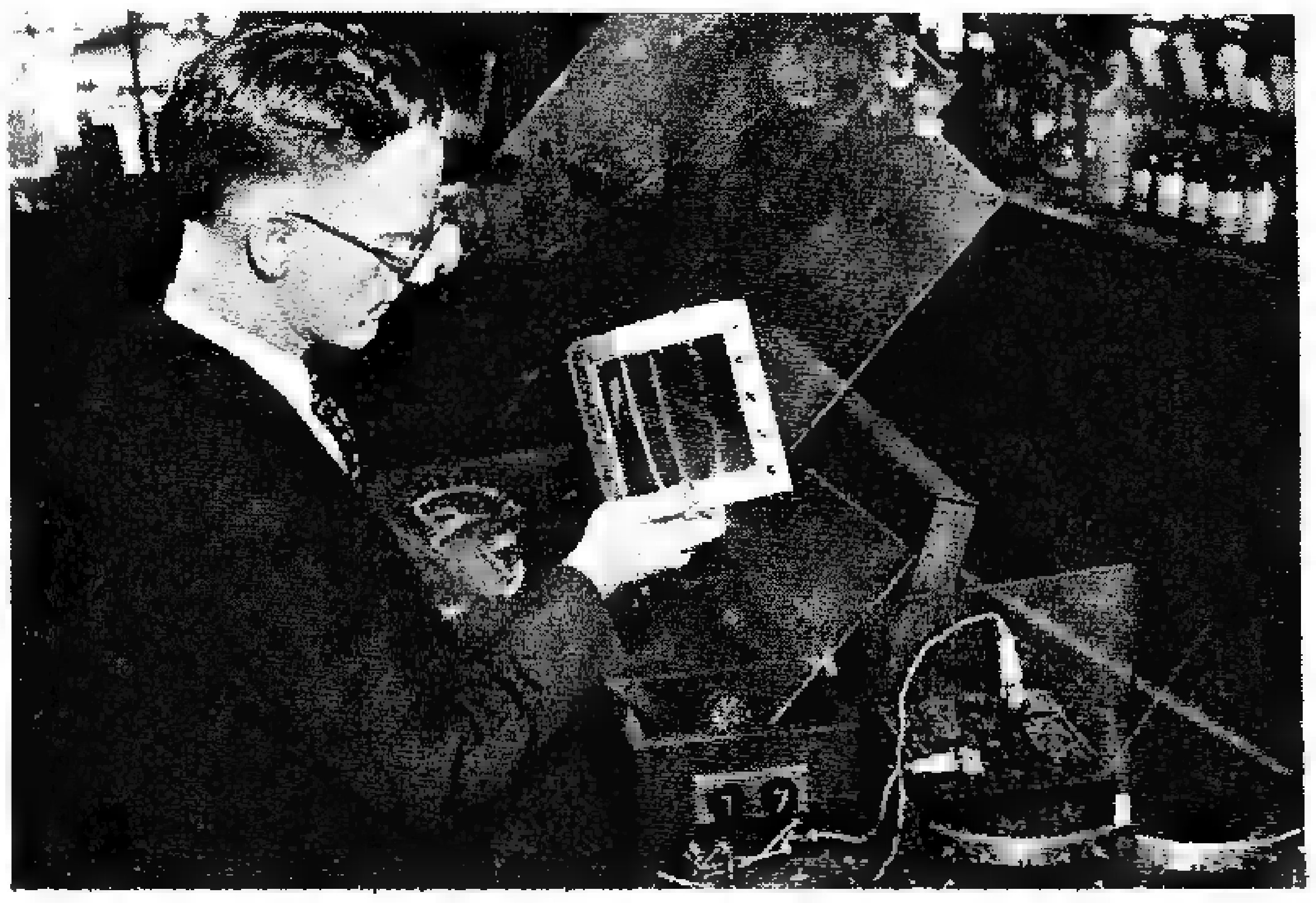
AFTER many attempts to fly a rocket plane across Greenwood Lake, N. Y., into the state of New Jersey F. W. Kessler, scientist and rocket designer, finally achieved his goal. The plane, loaded with 6,149 pieces of United States mail took off from an inclined runway and flew about one-quarter mile before coming to earth across the New Jersey state line.

While the plane was expected to make a two and one-half-mile flight its sponsors were, nevertheless, satisfied with results as they represented stamp collectors in all parts of the country anxious to add a rocket flight cover to their collections.



Sponsored by stamp collectors located in all parts of the country this rocket glider made its first successful flight by carrying 6,149 pieces of mail across a New York lake.

New Glass Bends Like Celluloid



Dr. G. M. Kline, chief of the Bureau of Standards, Plastics Division is shown here testing the new plastic aviation glass which has the same flexible properties of celluloid.

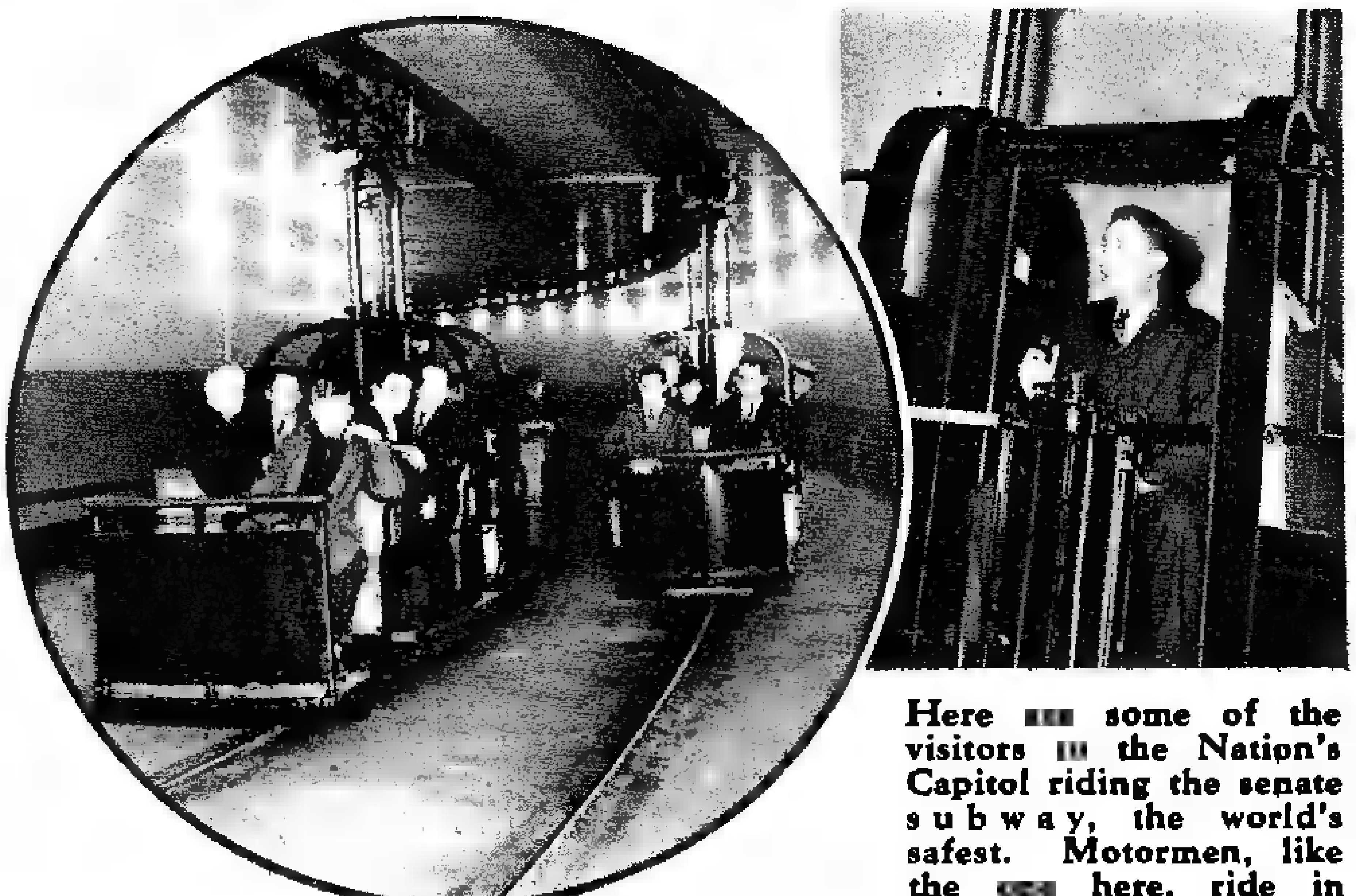
WITH aviations rapid advancement the United States Bureau of Standards is interested in a glass for airplane windows which will not crack of break under the unusual stress. In tests made in the Bureau's laboratories on the various forms of glass a new plastic material proved the most logical successor to that now in use.

The plastic glass is similar in many ways to celluloid except that it is free from any yellow cast and will not burn readily. It may be bent to any shape which makes it valuable for curved windows and windshields on both aircraft and automobiles. Although the new glass scratches more easily than the common type government experts expect that a "hard" plastic glass will soon be available for general consumption.

Senate Subway Is Safest In U. S.

CLAIMED to be the safest subway system in the world, the Senate subway, connecting the Senate office building with the Capitol, has been operating without a single accident for the past 24 years. Only two cars are used on the line which operates on an overhead rail system with the current being supplied by a conductor in the floor. The motormen ride in the center of the cars since they cannot be turned around at the end of the run.

Each car has a normal seating capacity of 24 and travels at a maximum speed of 5 miles per hour. When installed in 1912 the complete system cost the government only $9,500 and in its years of operation has cost very little for upkeep. While only United States Senators may call the cars anyone may ride them upon invitation. Yearly thousands of visitors are offered a "lift" by the lawmakers.



Here are some of the visitors in the Nation's Capitol riding the senate subway, the world's safest. Motormen, like the one here, ride in the center of the car.

Outshooting

by
STERLING
GLEASON

The radio police officer is a new breed of marksman, expertly trained to snap-shooting at fleeing targets from emergency positions. The six-gun man of the old West originated this deadly technique, which is simply draw and shoot without seemingly taking aim. But constant practice makes a man a dead shot regardless of the target.

BEFORE a crowded gallery, Los Angeles policemen were demonstrating their skill at revolver shooting.

One officer lit a cigarette and turned sideways. The other, having paced off the right distance, took steady aim and shot the cigarette in half.

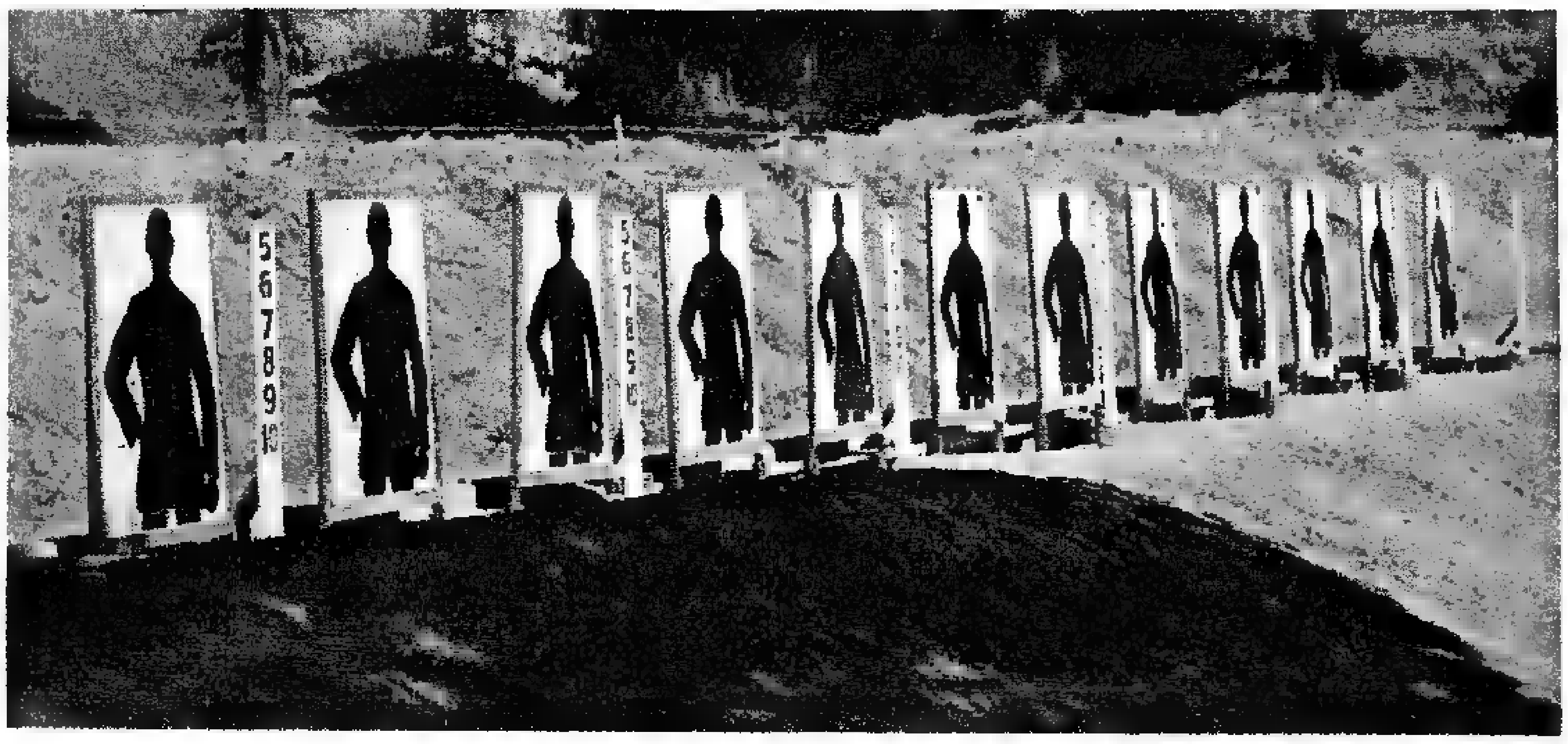
The audience was loud in its applause. But one spectator was heard to say, "Aw, that trick-shooting cop has just seen the Annie Oakley movie, and now he is playing hero."

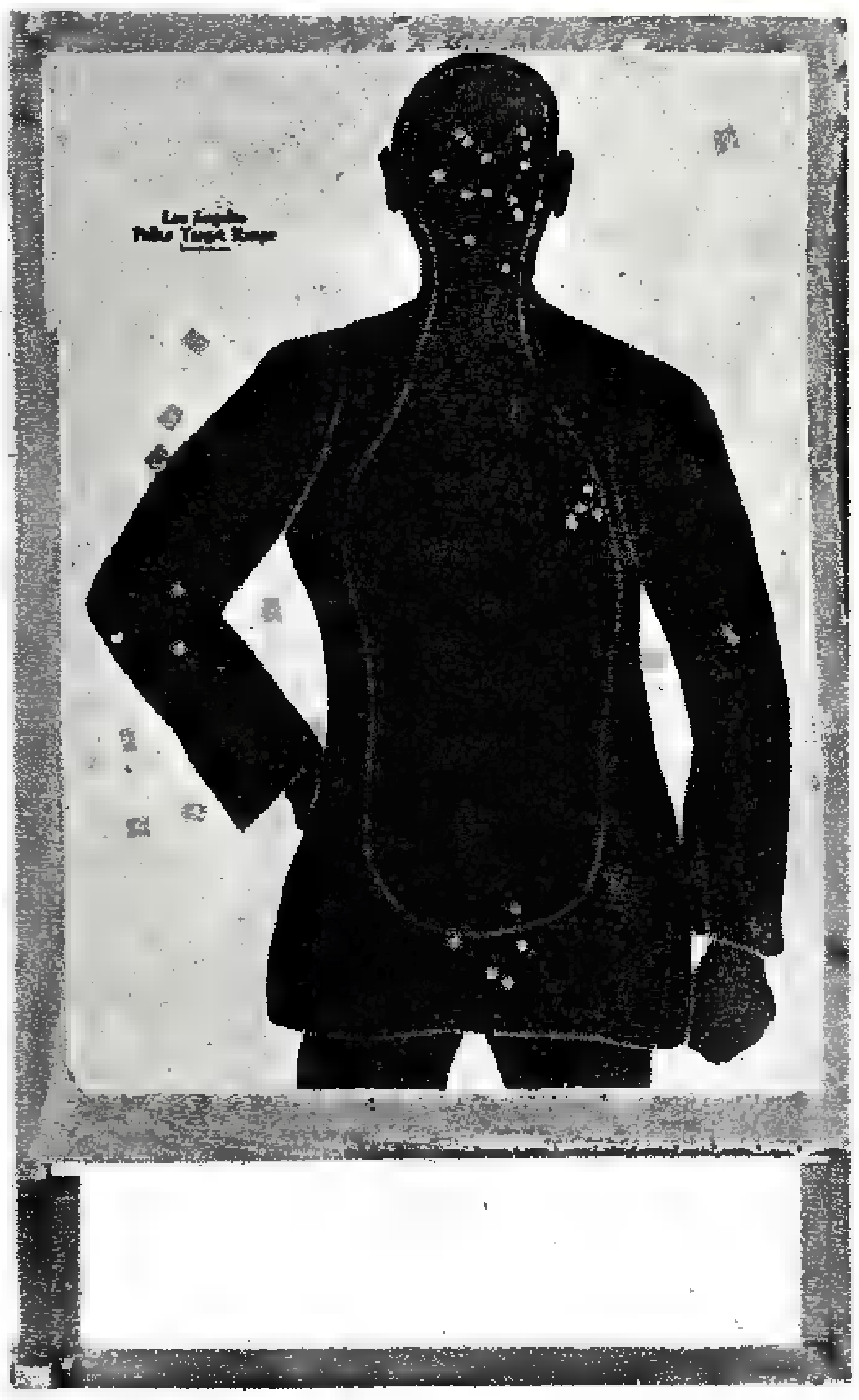
"Trick-shooting cop?" Well, maybe. Every police officer in America has dreams of becoming a second Billy-the-Kid. Still, had the caustic gentleman making this remark, been at a certain downtown street intersection recently, he would have been pretty much ashamed of himself. For a "trick-shooting cop" was directing traffic there when it happened.

A screaming motorcycle siren brought the traffic officer to attention. A recklessly driven sedan was hurtling towards him, behind which rocketed the motorcycle officer pouring in lead and receiving a deadly barrage in return.

The traffic officer, trained for just such an emergency, shot the driver squarely through the heart as the car flashed by him. But a burst of death from inside the car toppled that "trick-shooting cop" to the pavement, fatally wounded. The driverless car swerved and crashed, and then there was a gun battle

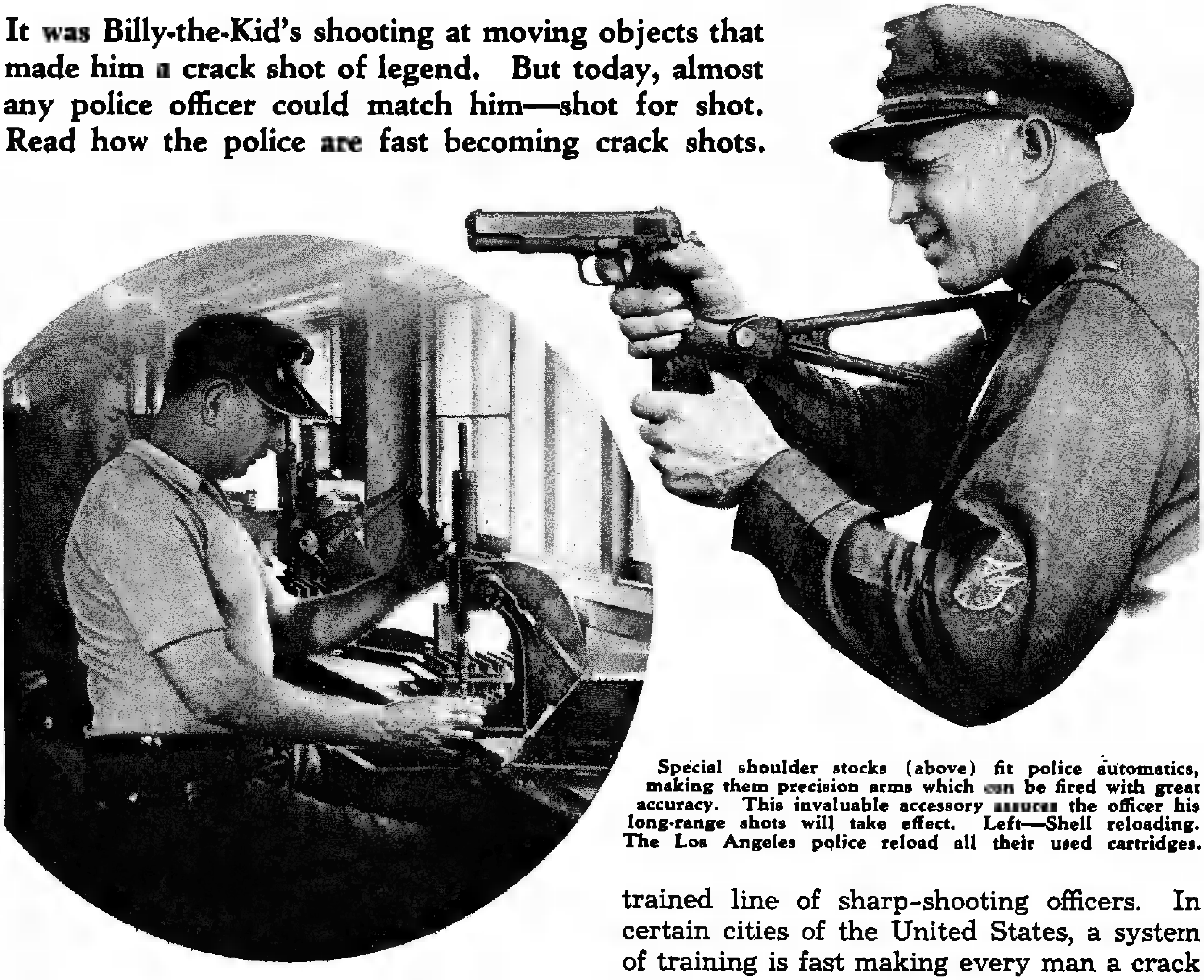
Up from the pits (left) jump police targets, and the officers pour in their fire. How surely shots are placed is shown in the photo at right.





the Guns of Gangland

It was Billy-the-Kid's shooting at moving objects that made him a crack shot of legend. But today, almost any police officer could match him—shot for shot. Read how the police are fast becoming crack shots.



Special shoulder stocks (above) fit police automatics, making them precision arms which can be fired with great accuracy. This invaluable accessory assures the officer his long-range shots will take effect. Left—Shell reloading. The Los Angeles police reload all their used cartridges.

royal, for police appeared out of thin air. In the car was found the loot from a bank robbery committed only a few moments before.

Back of the brilliant shooting which dazzles spectators at police ranges, lies long, steady practice and training which is making police marksmanship feared by the underworld as never before. A modern police department today is really a miniature army, complete from its arsenals, bristling with sub-machine guns, riot guns, high-powered rifles, and side-arms, to grenades and guns which lay down a barrage of gas. There are armored cars with bullet-proof windows, and shielded tires, forming veritable tanks for street warfare; armored motorcycles with machine guns or automatic pistols, mounted between handlebars.

Most important of all, however, is a well-trained line of sharp-shooting officers. In certain cities of the United States, a system of training is fast making every man a crack shot, and as a result, police guns are speaking with new authority.

Every month, each man on the Los Angeles force, from the Chief on down, must go to the pistol range to demonstrate his skill with the revolver. On the firing line he finds a dozen or more other officers, also anxious to qualify. In the sunken pits just below the earthen backstops, trusties are waiting, ready to aid by manipulating the targets and recording the hits.

Speaking into a microphone, a rangemaster directs the fire. At his command, targets jump up from the trench.

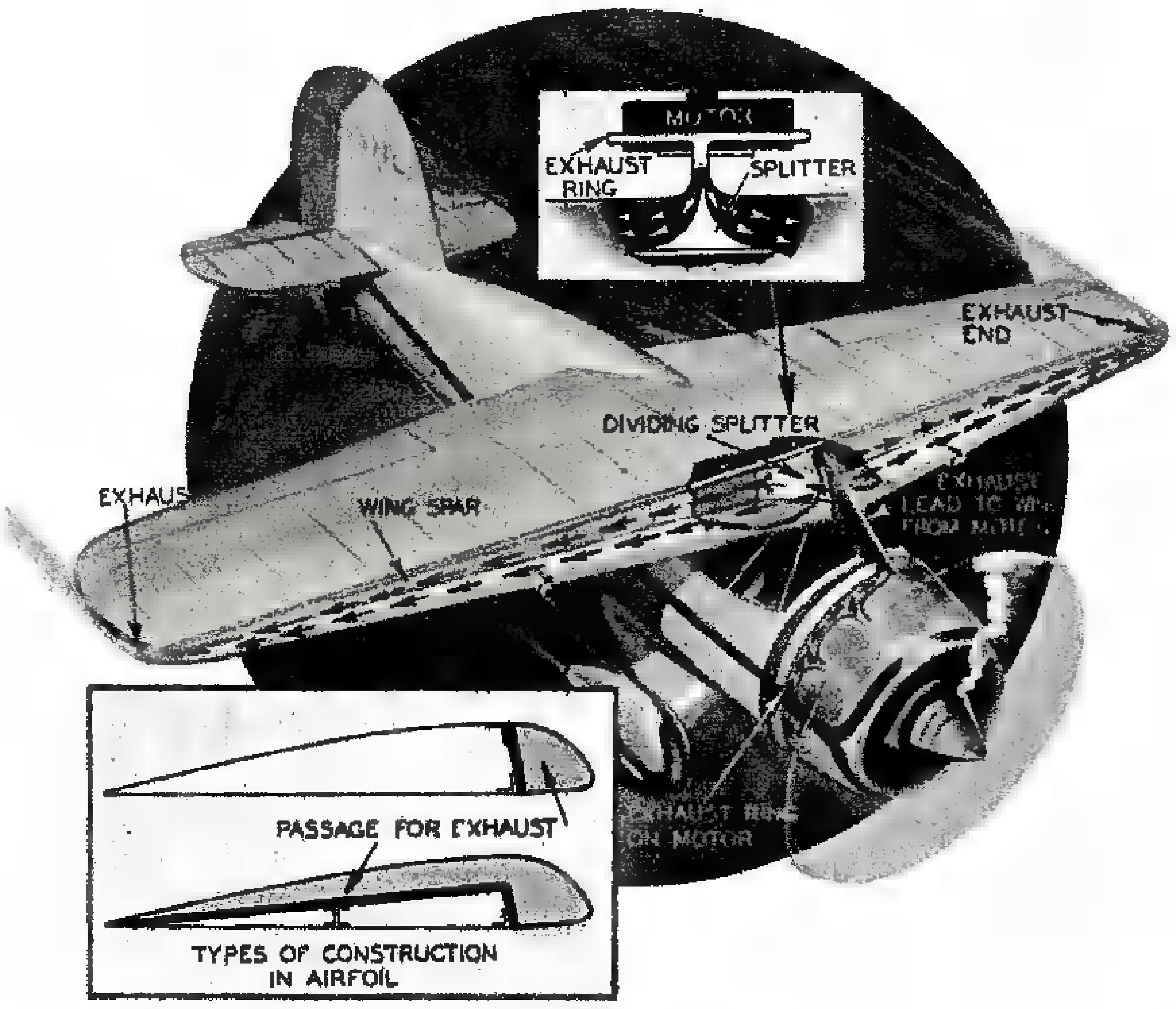
"Fire!" comes the command.

A dozen pistols speak at once. Holes appear in the paper-covered targets.

Now, from the pits, bamboo pointers dart upward. Pointing first to each hit, then to a numbered post beside the target, the stick

[*Continued on page* 132]

Exhaust Heats Airplane's Wings, Prevents Ice Forming


MOTOR
EXHAUST RING
SPLITTER
EXHAUST END
DIVIDING SPLITTER
EXHAUS
WING SPAR
EXHAUST LEAD TO WING FROM MOTOR
PASSAGE FOR EXHAUST
EXHAUST RING ON MOTOR
TYPES OF CONSTRUCTION IN AIRFOIL

Heat from the exhaust of this recently patented airplane is forced through the wing structure proving sufficient to keep ice from forming on the wings during winter flights.

REALIZING that ice forming on the wings of airplanes was very often responsible for winter crashes F. L. Janson, a New York inventor, decided to attempt to perfect a device that would eliminate this hazard. After several years of continued research he succeeded in developing a device which, in the eyes of the patent office officials, was worthy of protection. Aeronautical experts, too, have agreed that the device has possibilities.

The operation of the ice defroster is simple. The leading edges of the wings are hollow and serve as air ducts through which the hot exhaust fumes pass. The plane rushing through space causes the exhaust heat to be drawn out through the tips of the wings.

Rubber Used to Furnish Entire Room

TO FURTHER its claim as the rubber city of the world an Akron, Ohio, hotel recently opened to the public a dining room in which all decorations and furnishings are made of rubber. Murals on the walls depict the various stages in the manufacture of automobile tires from the time the rubber is gathered on the plantations. On the floor rubber covering replaces the more common material giving a softer walking surface. Automobile tires hung from the ceiling form the housing for the indirect lighting. Rubber is also used for furniture upholstery, walls, table and counter tops.

RUBBER TIRES
RUBBER MURALS
RUBBER FLOORS, WALLS, TABLES AND COUNTERS
RUBBER STOOLS AND CHAIRS

All fittings in this original hotel dining room are of rubber including the murals on the walls. Genuine automobile tires form the ceiling lights while miniature ones serve as ash trays.

Baby Carriage Has Stair Climber

The young lady shown here is experiencing little trouble in wheeling the carriage down the stairs. Fitted with a caterpiller chain drive the coach may be safely handled by anyone.

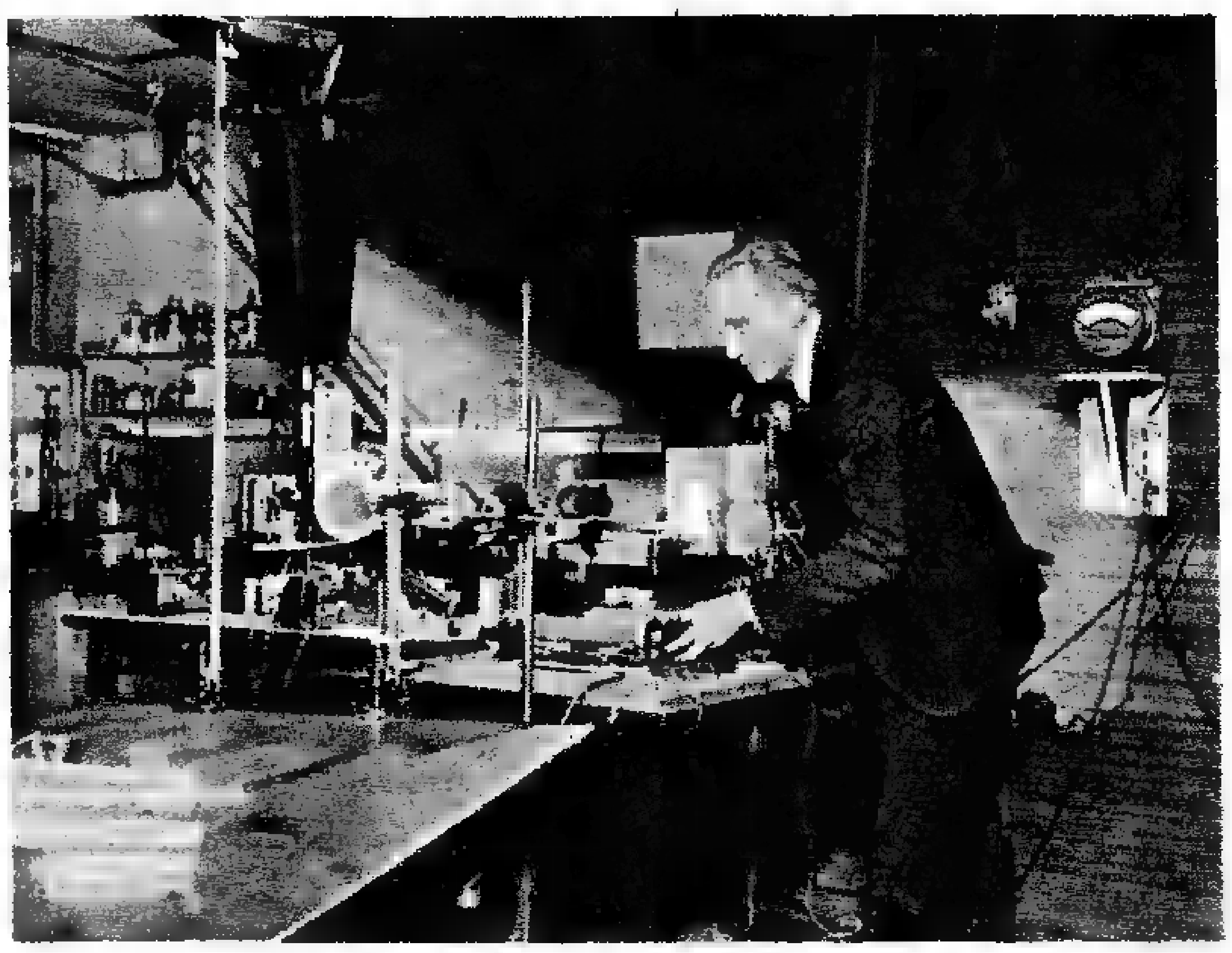
CONCEIVED by a German inventor a simple baby carriage attachment makes it possible for even a child to safely wheel the cart down a flight of stairs. Employing a caterpillar chain drive the carriage is lowered or raised without undue effort. Not in use, the chain mechanism folds out of the way.

Sun's Heat Surpassed by Electric Arc

WORKING in the laboratory of Northwestern University, Professor W. S. Huxford of the school's faculty has succeeded in producing temperatures greater than the heat of the sun. Special electric arcs of pure graphite developed 12,000 degree temperatures which were recorded and measured by a radiometer and spectroscope in order that permanent records of the experiments could be kept.

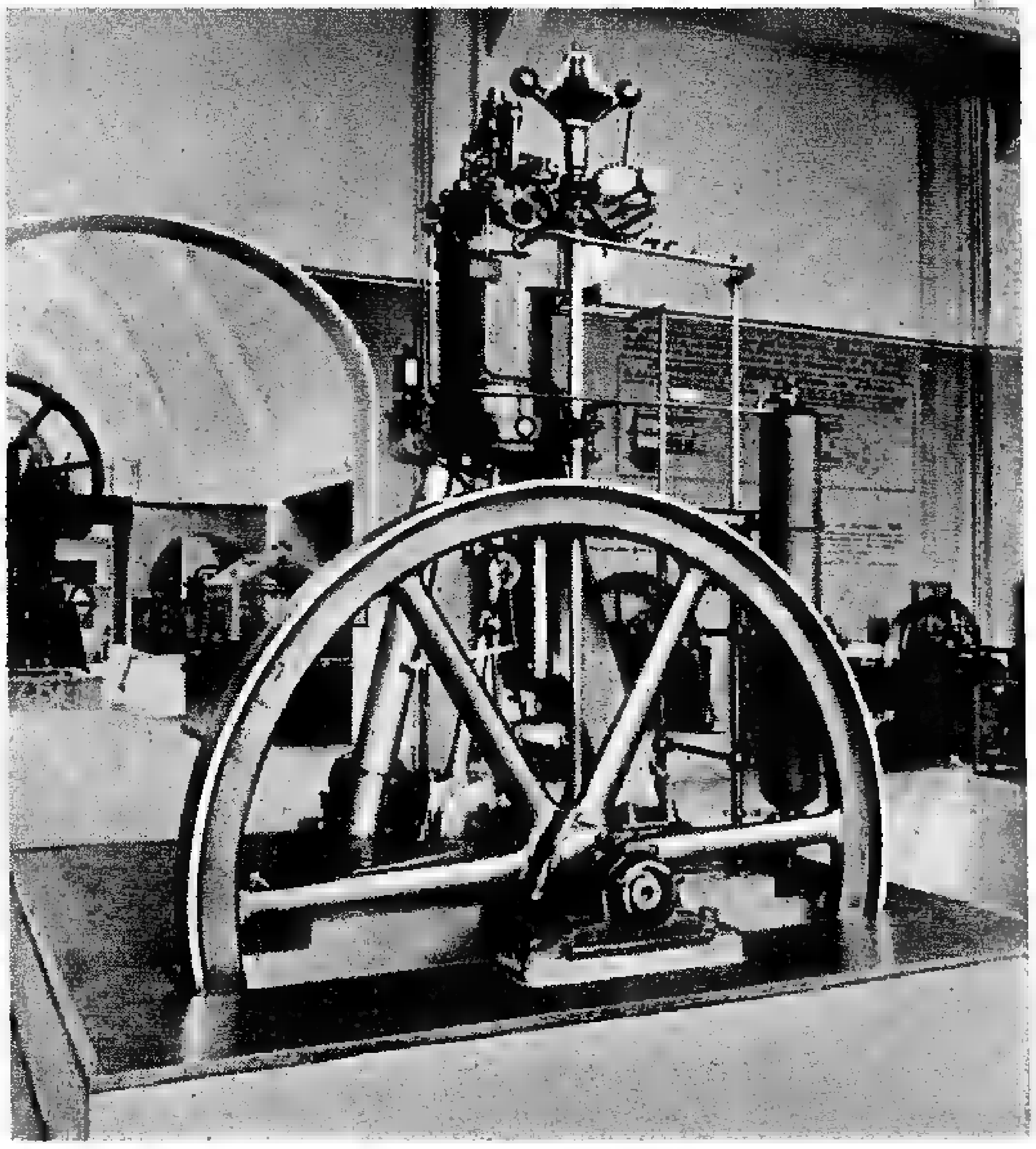
Professor Huxford was assisted in his work by Dr. William T. Gray, a former research student, who also helped develop the special apparatus required to measure the unusually high temperatures.

To carry out the experiments the scientists employed special direct current generators which were capable of properly actuating the graphite arc.



Professor W. S. Huxford of Northwestern University is shown here before the electric arc which developed temperatures exceeding the heat of the sun by several thousand degrees.

Show First Diesel At Museum



From this crude machine was born the modern diesel motor. The first motor, shown here, is now on exhibit at the German Museum at Munich and is the invention of the late E. Diesel.

LOCATED in the German Museum at Munich is the first practical diesel engine ever to be used in industry. The motor, constructed in 1896 by E. Diesel, failed to meet with the approval of the public at that time and his invention went unheralded until a few years ago. Today this same machine, with certain physical changes, is in great demand.

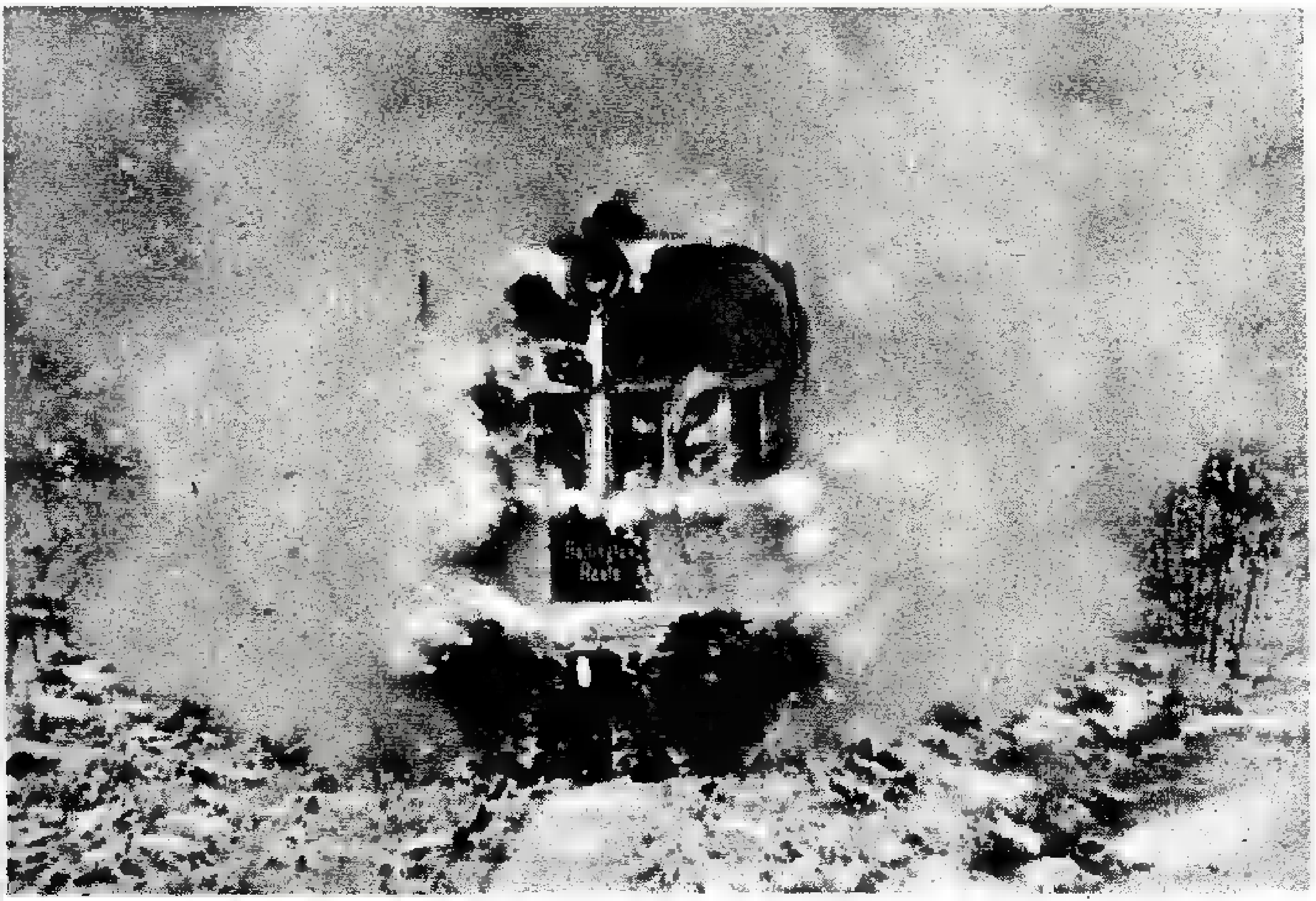
Finds Formula for Synthetic Ice

EMPLOYING a secret process Edward Kelley, a well known skater of Chicago, Illinois, has developed a secret process whereby ice skating may be enjoyed the year round. A chemical substance, having qualities similar to ice is applied to the skating surface in liquid form. When the material has cooled it is ready to be skated on.

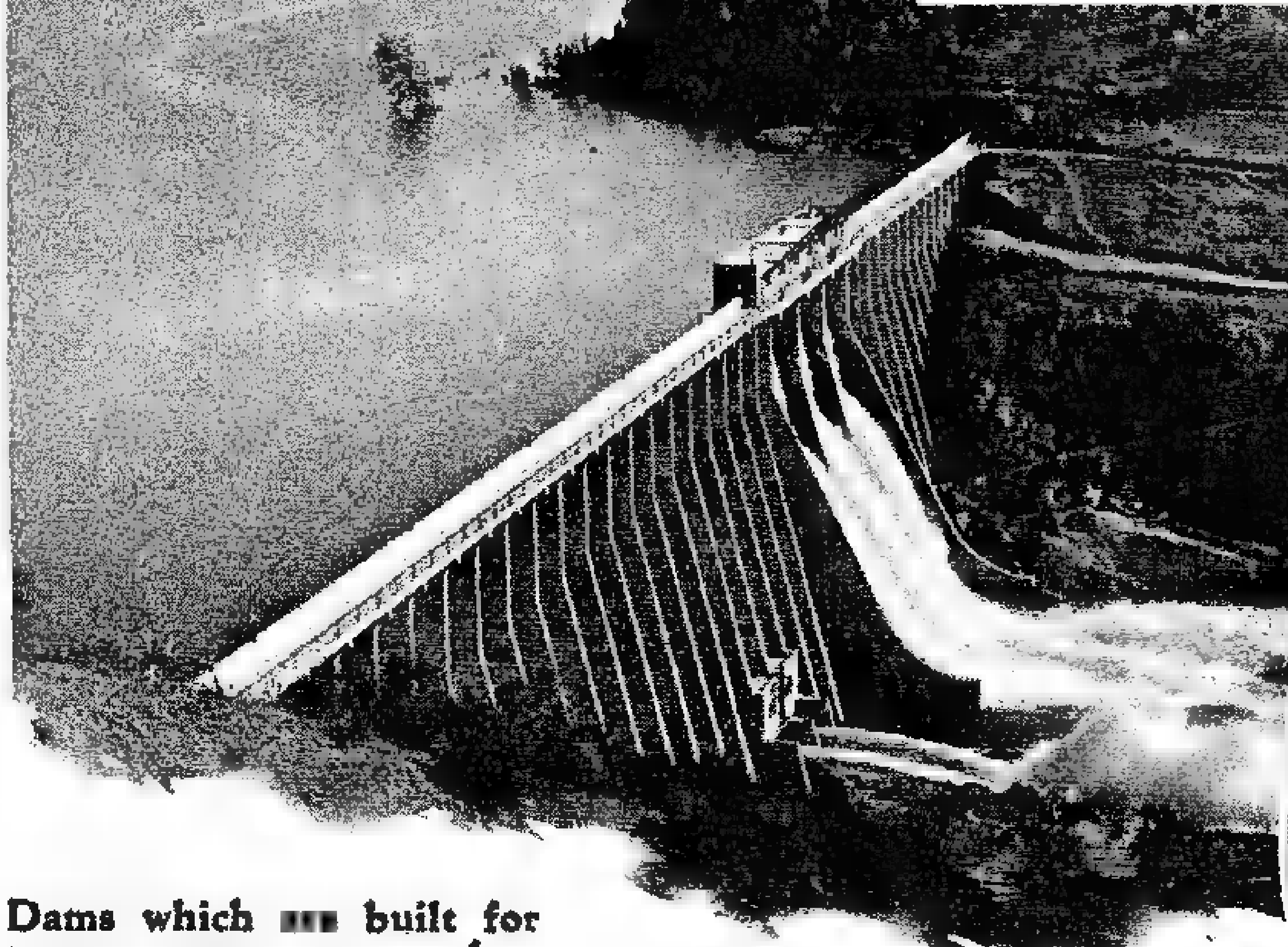
Applied to any surface in boiling liquid form this chemical ice hardens in a few hours leaving a skating rink equal to one of actual ice. The chemical may be reheated and used again.

FLOODS—WINTER'S

Stalking the coldest winter in years, it sneaks beneath your door, this fluid snake. And once having watched its rise, you realize that no monster is more to be feared than FLOOD WATERS.



This past winter, worst in half a century, wreaked havoc on transportation, but the Zephyr bowls uninterrupted through drifts at eighty miles per hour. Melting snow now threatens thousands of homes.



Dams which are built for power purposes are often valuable protection against flood losses and damage.

Utah flood waters swirled down on Salt Lake City, piling up cars in one of Mother Nature's unusual freak traffic jams.

THE gentle patter of spring rain on the roof is a positive cure for insomnia. Yet, in Paga-Pago it is practically impossible to outsleep the "devil-drum" drops, for there the tropical rains are seemingly endless. But, for downright fear of rain, take America's flood area population just about this time of year.

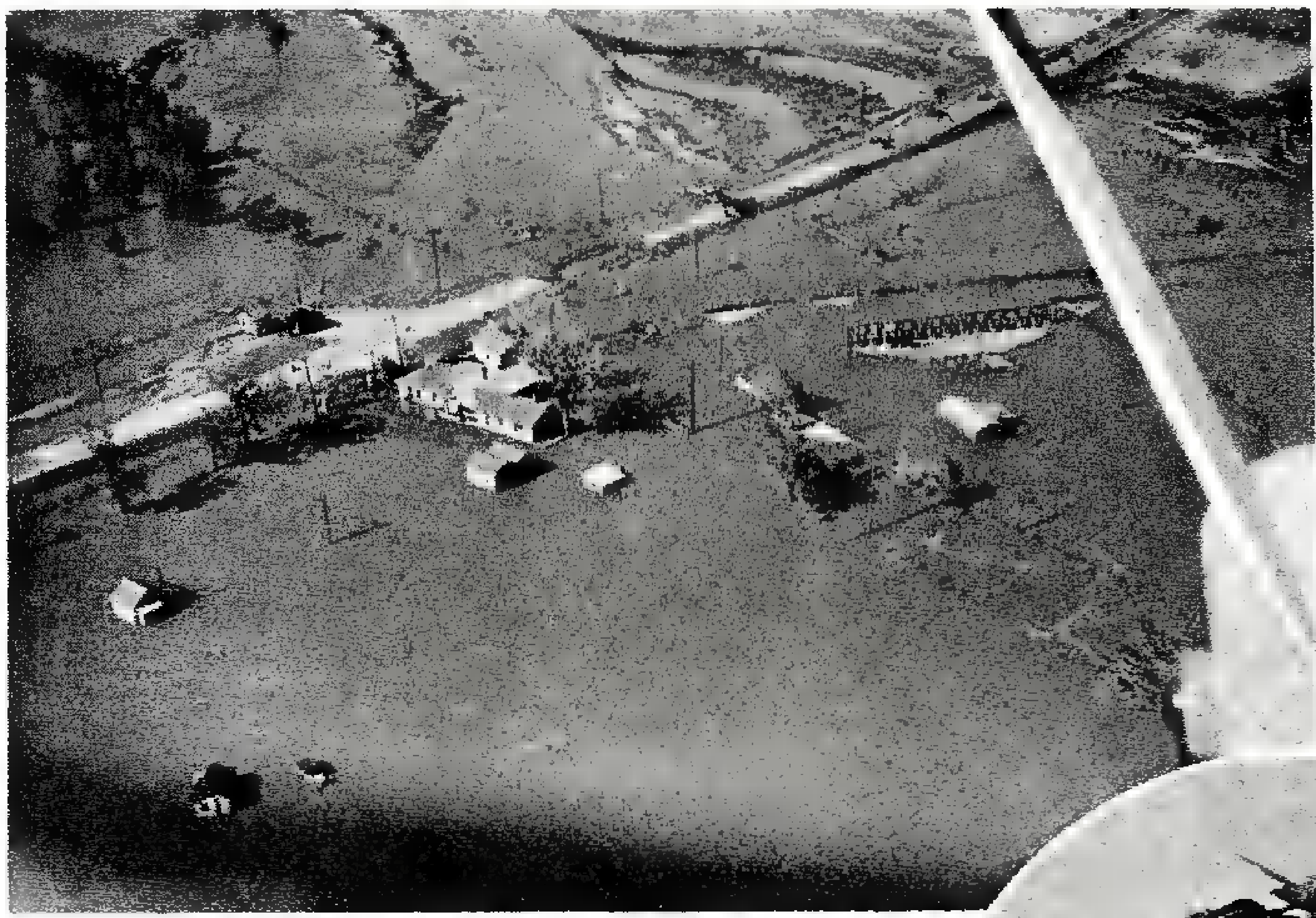
Millions of people worry when it rains in this area. They know that rain melts snow, that snow turns to water and that water runs downhill. This past winter found the northern states blockaded by one of the worst series of blizzards ever recorded. Damage by snowfall alone ran into the millions, while the costs in snow removal, delayed transportation and interrupted communication service have not yet been totaled. Added to this was the loss in human life. And still the toll of winter has not been paid in full. There remain the floods, the dread result of the snows melting too fast for nature's water troughs.

Approximately twenty-five million dollars worth of property, not to mention more than a hundred lives were lost when flood waters swept down from the hills in eastern Colorado and southwestern Nebraska early in June 1935.

The Republican River, swollen by cloudburst rainfall, rose to heights never before known. During succeeding weeks similar floods devastated parts of Texas, Wisconsin,

Devastating AFTERMATH

by IVAN E. HOUK



When you view newsreel shots of a flood, think kindly of the airplane pilot. He always directs emergency relief for those in immediate danger.

The house built upon sand or rock is a "push over" for Old Man River when he goes on a rampage. A lifetime of endeavor was wrecked when the house (above) and surrounding buildings also were damaged.

Piled up in Chagrin River, ice floes, the aftermath of the February blizzards, defy dynamite blasts discharged to break jams. Flood waters were sent backwashing through the Ohio countryside before the treacherous jams were finally broken.

Ohio, Pennsylvania, and New York. The south central New York floods of July 7 and 8 caused the death of fifty-five people and the loss of more than twenty-five million dollars worth of property.

When two inches of rain falls in a single day people think they have had an exceptionally heavy storm. When four inches falls in one night they think they have had a cloudburst. Twenty-four inches, two whole feet of water, fell in southwestern Nebraska that night of June 1. No wonder the Republican River went on a rampage. Bridges were wrecked, railways torn out, buildings destroyed, homes washed away, and whole families drowned. This was the most extraordinary rainfall ever known in that section of the country.

Disastrous floods result from several causes. They result from the breaking of levees, the failure of dams, or the formation and subsequent collapse of ice gorges. They result from the temporary blocking of stream channels by landslides, snowslides, or ice avalanches from overhanging glaciers. They may be due to the choking of watercourses by vegeation during the late summer months, or to the sudden melting of accumulated snow deposits during the late winter months. Sometimes they result from tidal waves caused by severe earthquake shocks, or from

[*Continued on page* 136]

PARAGRAPH ODDITIES
OF SCIENCE

INDIANS in this country skimmed petroleum from lakes and sold it to white people as a cure for aches and pains.—George Bowers, Gooding, Idaho.

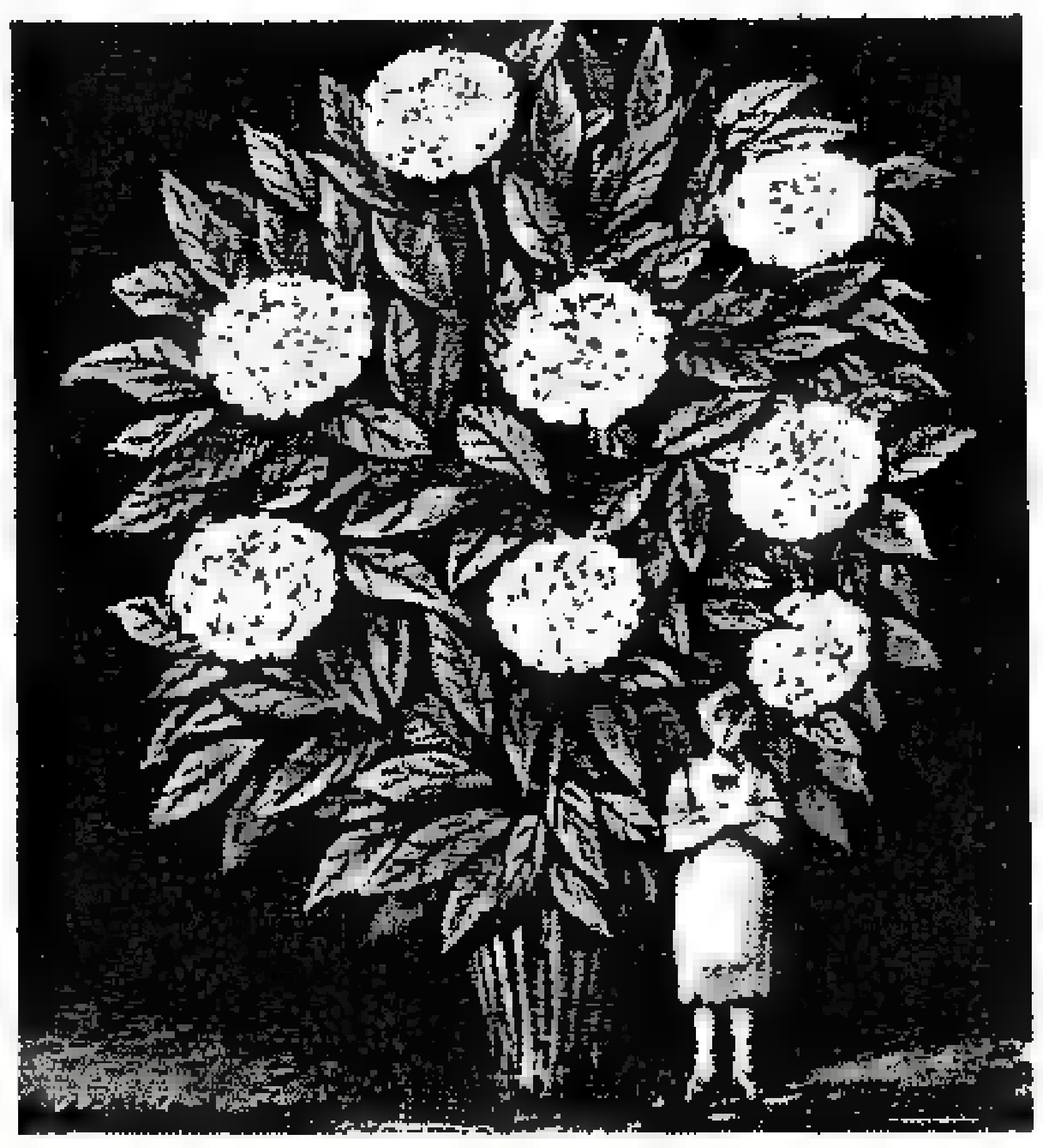
The human body throws off enough heat in one day to melt a 40-pound cake of ice and bring the remaining water to a boiling point.—Robert Garman, Palmyra, Penna.

Gold costs more to refine and mine than it is worth. The total sum spent in the quest of gold is estimated to be far more than the worth of all the metal ever mined.—Bert Haun, LeRoy, N. Y.

If all the cigarettes smoked in the United States in one year were placed end-to-end they would reach from the earth to the moon with enough remaining to encircle the globe one and one-half times.—Dan Sharpe, Jr., Hertford, N. C.

There is enough illuminating gas on the planet Neptune, to supply the needs of earthly beings for 21 million years.—Allen Glasser, Bronx, New York.

Carbon monoxide victims die of starvation. The gas forms so stable a compound with the hemoglobin of the blood that the oxygen finds no room for the red corpuscles.—George T. Becker, Wauwatosa, Wis.



A dahlia measuring 16 feet in height was grown by a New York woman during the summer of 1935. It had eight blooms.—H. A. Morris, Allentown, Pa.

In Russia insects and a species of small lobsters born over 3,000 years ago have been revived and are pursuing a normal existence.—Robert Bacon, Chicago, Ill.

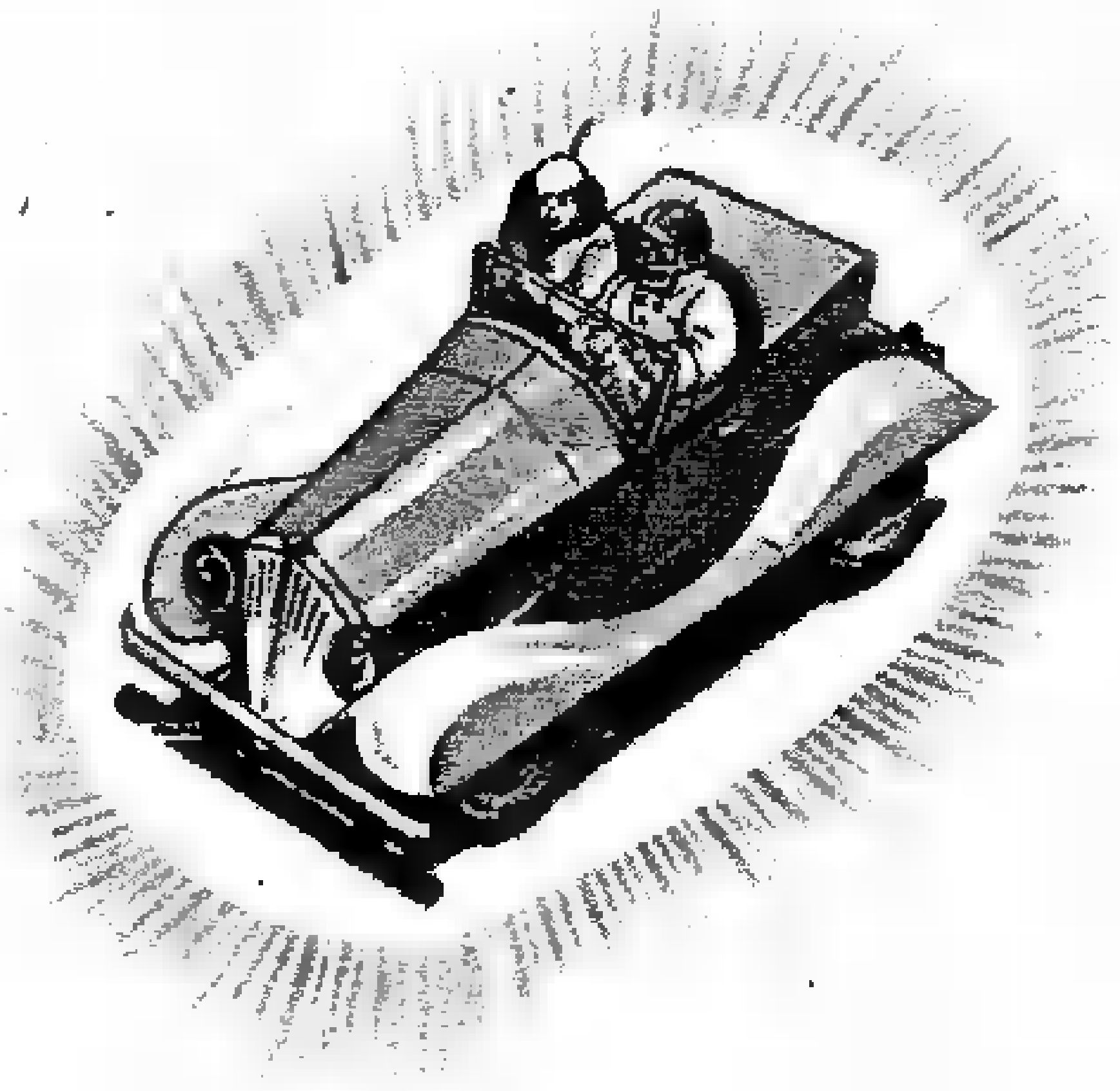
One gram of radium gives off enough heat to melt its own weight in ice every hour.—Arnold M. Hofer, Bridgewater, S. Dak.

Gold may be beaten so thin that 1,200 sheets of gold leaf will be no thicker than a sheet of writing paper.—Aubert Hauenstein, Troy, N. Y.

The annual grain movement over the great lakes, amounting to four million bushels, is sufficient to load enough 50-car freight trains to reach from New York to San Francisco five times.—Morris A. Hall, White Plains, N. Y.

A watch that misses one tick in ten thousand will lose a minute in one week.—Wilmer Armstrong, Merrickville, Ont.

The wheels on cars entered in the races at Indianapolis Speedway revolve approximately 330,000 times in completing the 500-mile run.—W. B. Houston, Martinsville, Ind.



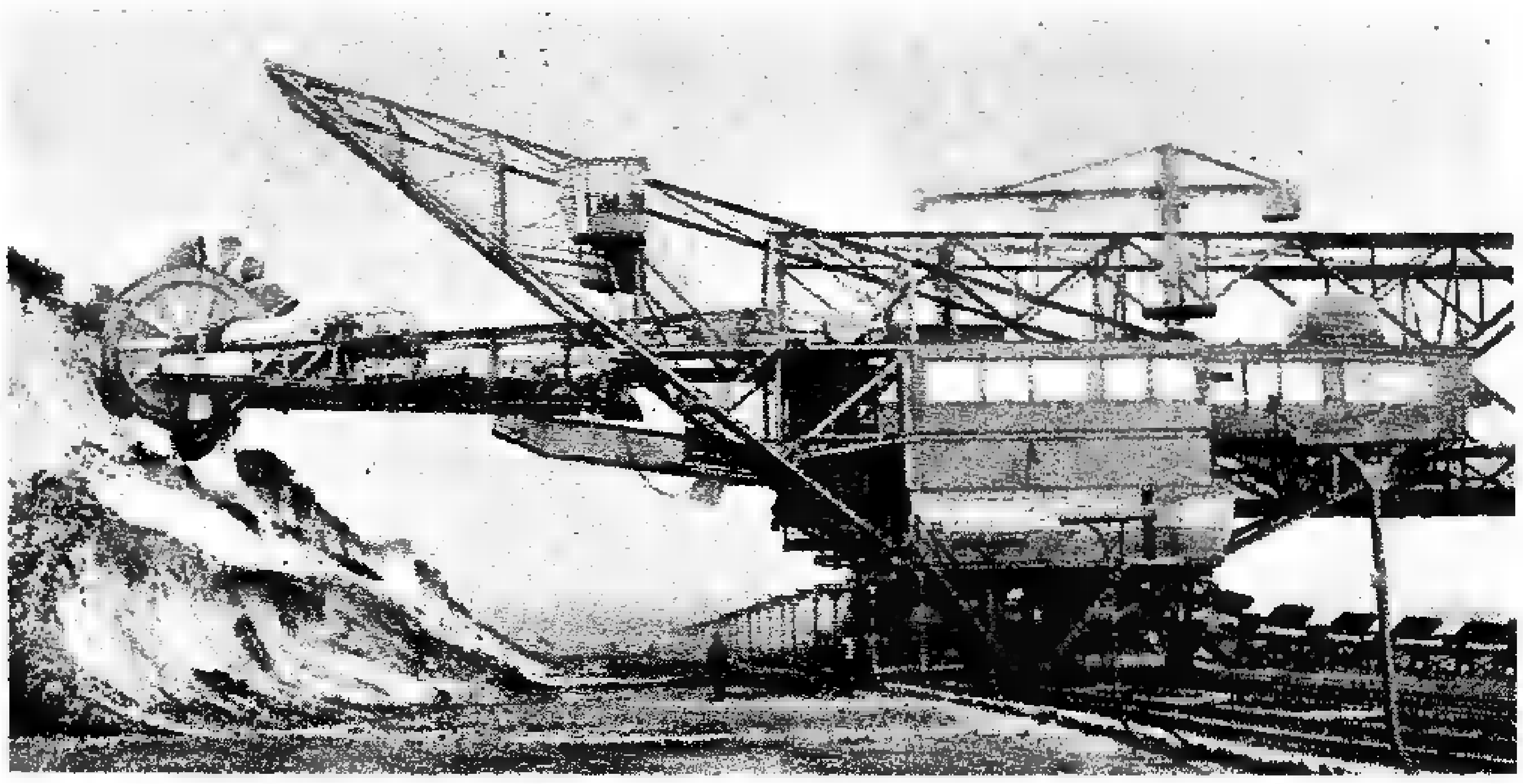
There is sufficient gold in the U. S. Treasury to pave a 10-foot highway from New York to Chicago with gold ¼ inch thick. — Lowell G. Ferguson, Manteca, Calif.

One dollar will be paid on publication for every Paragraph Oddity accepted. State source or proof. Do not include Oddities with contributions or letters for other departments. No items will be returned. Address "Oddities," Modern Mechanix Publishing Co., Fawcett Building, Greenwich, Conn.

Mighty Excavator Removes 900 Tons of Earth Per Hour

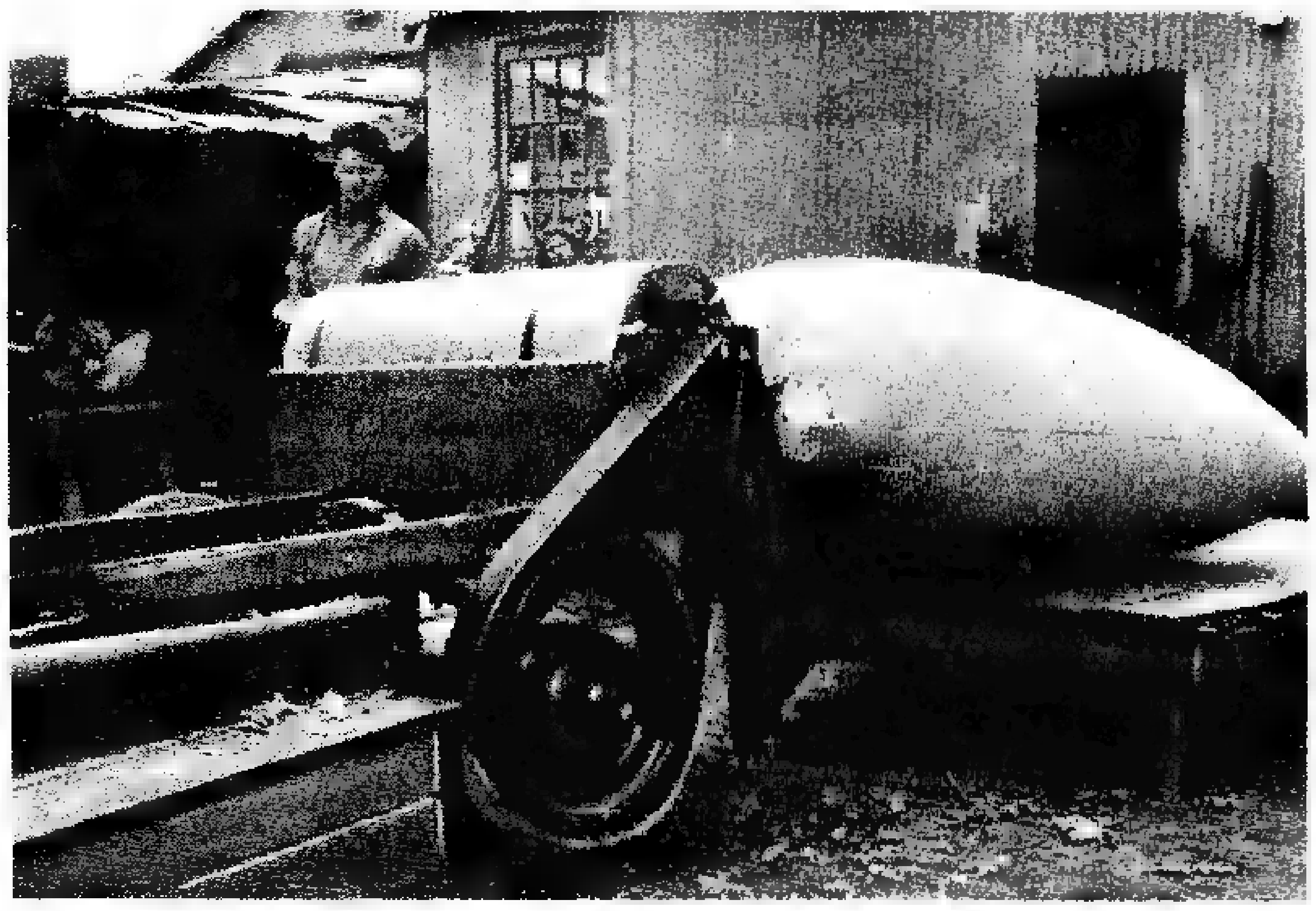
A HUGE combination excavator and dredging machine, the largest of its kind ever to be constructed, has been recently placed into operation in Germany. The excavator instead of removing earth with a single claw or bucket employs a bucket wheel speeding up the work considerably. In a single hour the machine is capable of removing from 600 to 700 cubic yards of solid ground.

So large is the machine that double railroad tracks are required to support its enormous weight. The chief operator in order that he may have a clear vision of the progress being made operates his controls from a glass enclosed pilot house located on the crane. Remote control mechanism connects the pilot house with the master controls in the engine rooms. In order that the dirt or other materials may be loaded efficiently a conveyor system is employed.



Capable of removing up to 1,500 tons of earth in a single hour this German built crane has a normal output of more than 900 tons. A rotary bucket removes six times as much soil as the type of scoop commonly employed.

Portable Gin Mounts On Truck



Mounted on the rear of an old auto, this homemade cotton gin removes the material from old mattresses and converts it into clean stuffing which is then blown into the new covering.

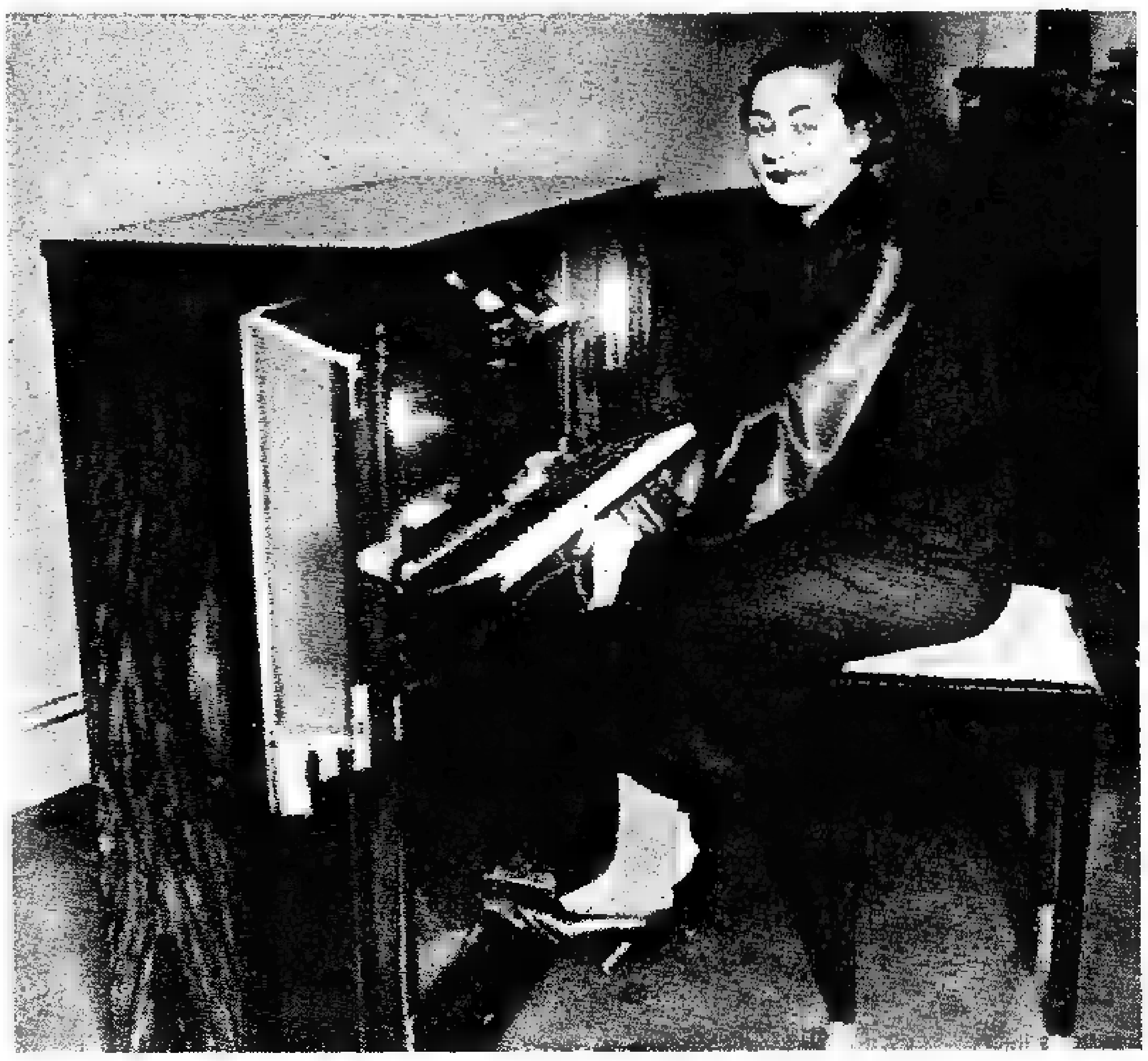
OLD mattresses may be quickly turned into new ones with a simple portable cotton gin invented by an Arizona man. The device is mounted on the chassis of an automobile and powered by jacking up the back and attaching a belt to the wheel.

A number of 8-inch rods welded to the shaft of the gin revolves, passing through a number of small pins set in the side of the device. Cotton is fed into a hopper where it is cleaned and then blown into a new mattress cover.

Piano Folds Into Buffet Cabinet

WITH the modern trend being toward useful furniture, manufacturers are constantly seeking ways of increasing usefulness of their products. Latest of these is an English device which is an attractive buffet cabinet that when opened becomes a piano.

The keyboard folds out of the way in jack knife fashion when not in use and the music rack, too, drops down to facilitate closing of the cabinet. The piano possesses unusual tone quality for its size with all of the features usually found on the most expensive instruments. Small electric lights mounted on each side of the music rack provide sufficient illumination for the player.



Where space is at a premium this compact piano will find much favor. Folded up, the instrument appears to be a buffet, but when opened becomes a beautifully-toned piano.

Amateurs *Capture* ACTION

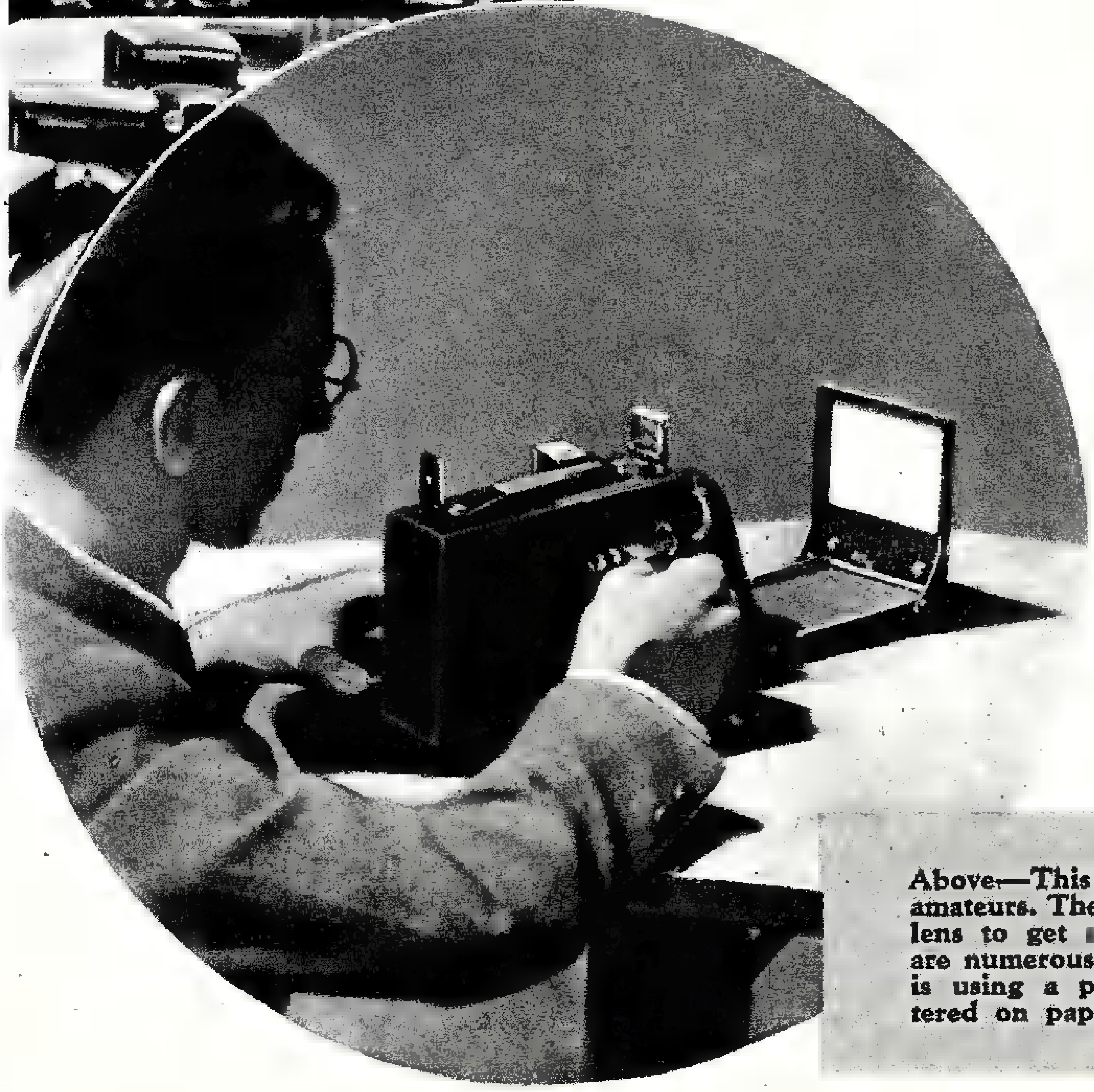
PRISON sirens howl as a band of desperate convicts blaze their way out of the penitentiary with smuggled guns. Hot on their trail follows an amateur cameraman. He photographs scenes of the resulting confusion, the hurried marshalling of police cars, the armed guards pacing the prison walls, the excited crowd of curiosity seekers, and gets human-interest shots overlooked by professional newsreel men.

A famous flyer is forced down far from big-city landing fields—and from the commercial movie reels. His accident enables a local amateur photographer to score a clean scoop which nets him a handsome profit.

A spectacular fire, a big marine collision, a flood, explosion, or earthquake—all spell opportunity for the hundreds of free-lance amateur cameramen who are invading the field of newsreel photography.

The unexpected, always happening, is the amateur newsreel man's best friend. Although most big news events are covered by pre-arrangement, now and then a sensational story smashes into the headlines, finding news-gathering agencies unprepared. A quick-witted amateur already on the scene may sell his negative to them if he acts promptly. A dollar a foot is the average rate, and sometimes more for

At the airport to welcome Amelia Earhart at the end of her Hawaii to California hop was an alert amateur cameraman. She rewarded him with this shot. Another amateur swung his camera into action to get shots of a Chinese New Year celebration. Part of the procession is shown at left.



Above—This is one of the latest 16-mm. cameras for amateurs. The cameraman is placing a filter over telephoto lens to get a close-up of distant action. Left—There are numerous kinks in newsreel work. Here an amateur is using a portable titling board. The titles are lettered on paper, inserted into holder, and quickly shot.

for the NEWSREELS

by
MAXWELL R.
GRANT

When a peaceful valley suddenly becomes the scene of a roaring flood, the amateur news cameraman is on the job. Where hurricanes rage or great explosions take their toll, the newsreels depend upon alert amateurs. This article tells how it is done.

exclusive, sensational pictures of national interest. Foreign subjects generally pay double.

Latest in newsreels is one distributed nationally, once a month, for home movie projectors. Recently press representatives sat in a darkened Hollywood projection room and watched the first edition of this sixteen-millimeter reel, shot entirely by amateurs, unfold late flashes from all parts of the country. They saw auto drivers speed around a dirt track in a championship race; watched in turn an athletic contest, a spectacular parade, and miners panning pay dirt in a new gold rush. They got glimpses of a rare turkey-fish from the South Seas; marveled at an odd, elephant-shaped fungus recently discovered in Nebraska; and watched a thrilling undersea battle between two fierce tropical fish.

Already two hundred cameramen are covering big news as it breaks, and more are wanted in every section of the country, according to one news editor.

"There are hundreds of news subjects in each locality waiting for you to photograph," he tells his contributors. "You must use your ingenuity and manufacture news, stunts, and human-interest subjects.

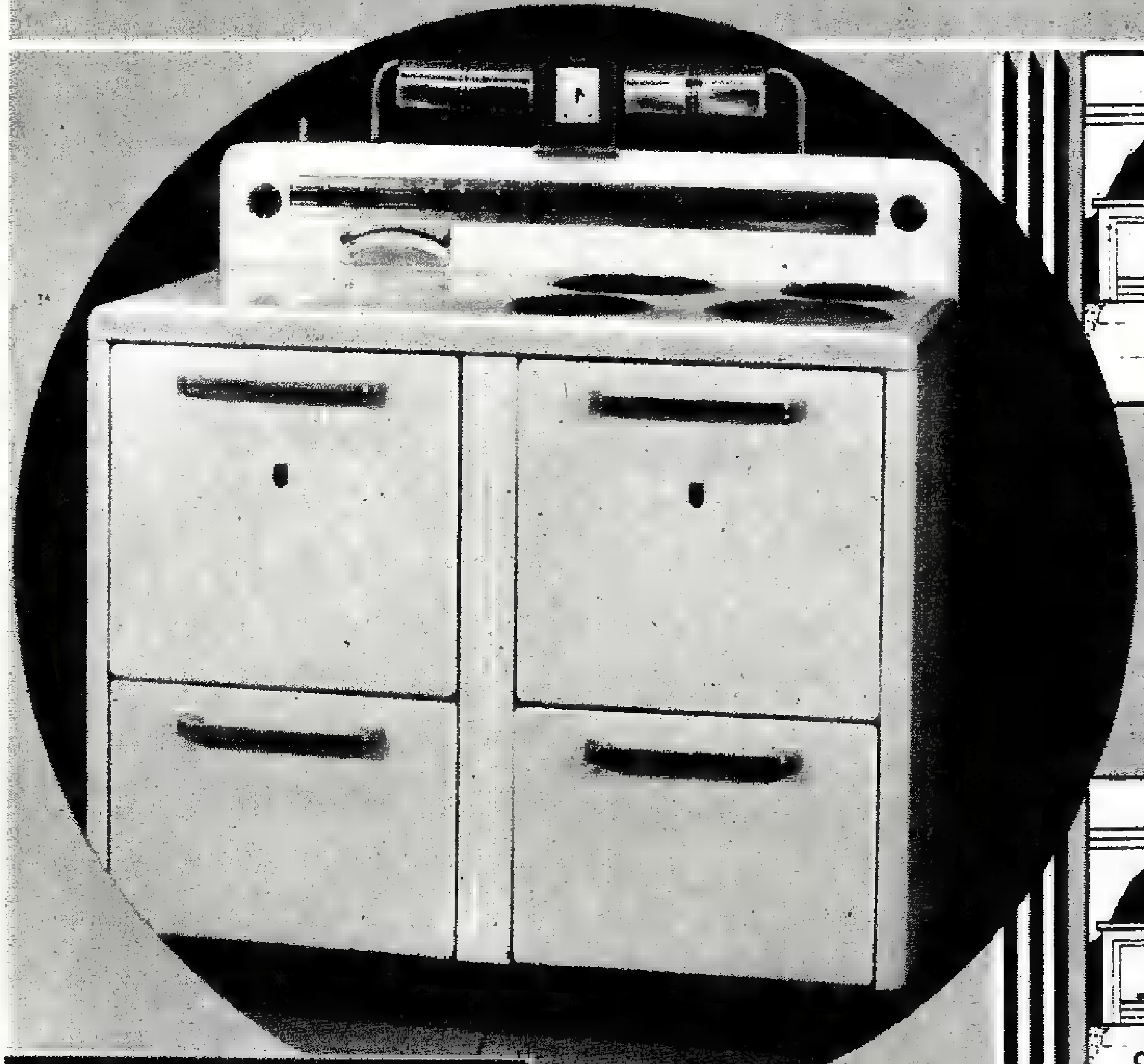
"If possible, shoot each subject from three different angles—eye-level; high, or 'bird's-eye' angle; and low, or 'worm's-eye' angle. If all your shots are taken at eye-level, break them up in the following manner: 1—Long shot; 2—Medium shot; 3—Close-up. Close-ups are the most important shots in newsreel work. The public likes to see the action near at hand.

"A tripod is essential, for only in cases of rare and spectacular news events—shots that cannot be re-taken—will we accept pictures that are unsteady on the screen. Don't panoram or tilt unless abso-

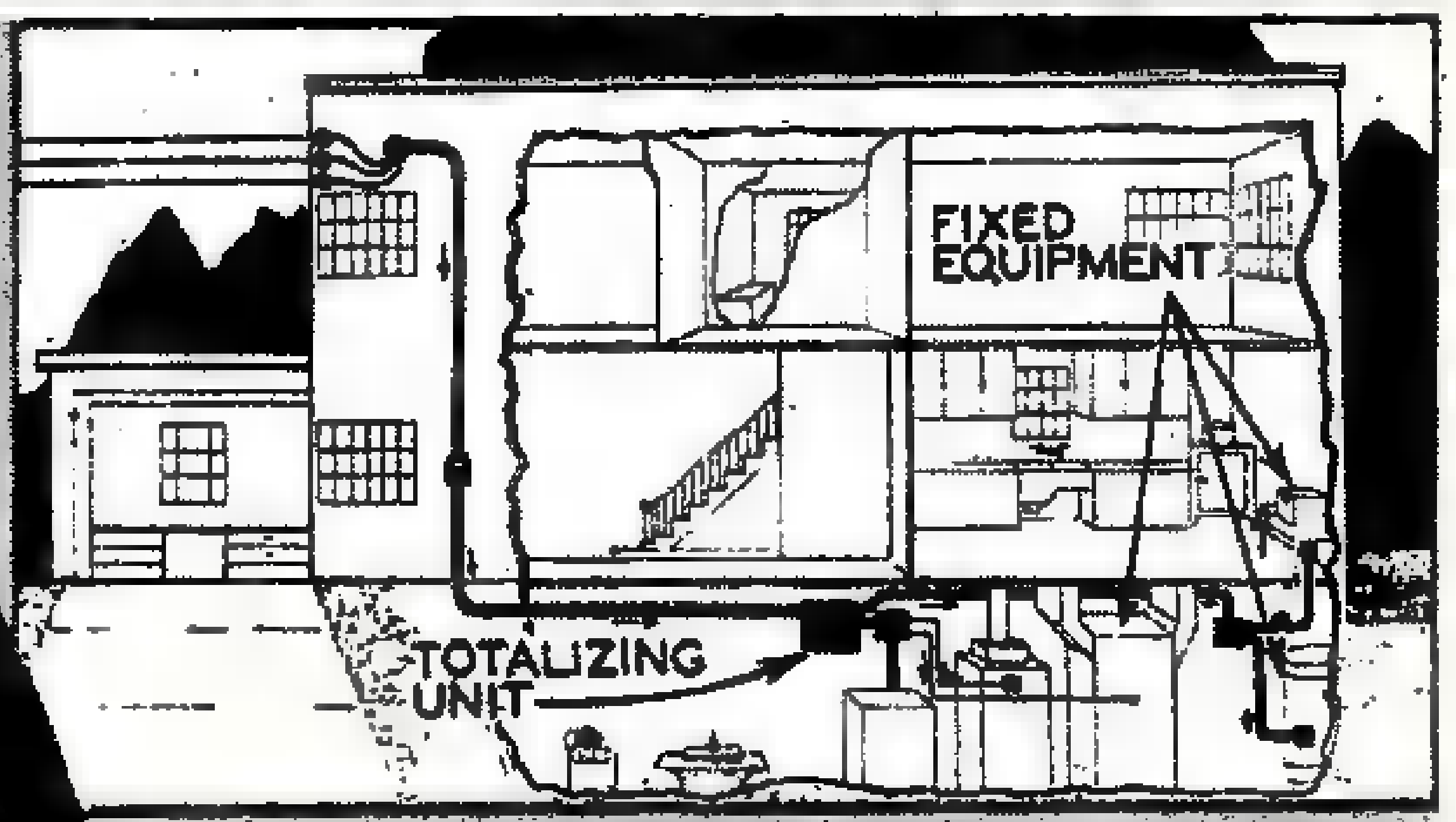
[*Continued on page* 124]

Army air maneuvers furnish a real test for the newsreel cameraman. Here two operators are engaged in filming the planes shown above using a telephoto lens and filter to bring the action closer. A long extension arm and universal tripod aid in rapid follow shots.

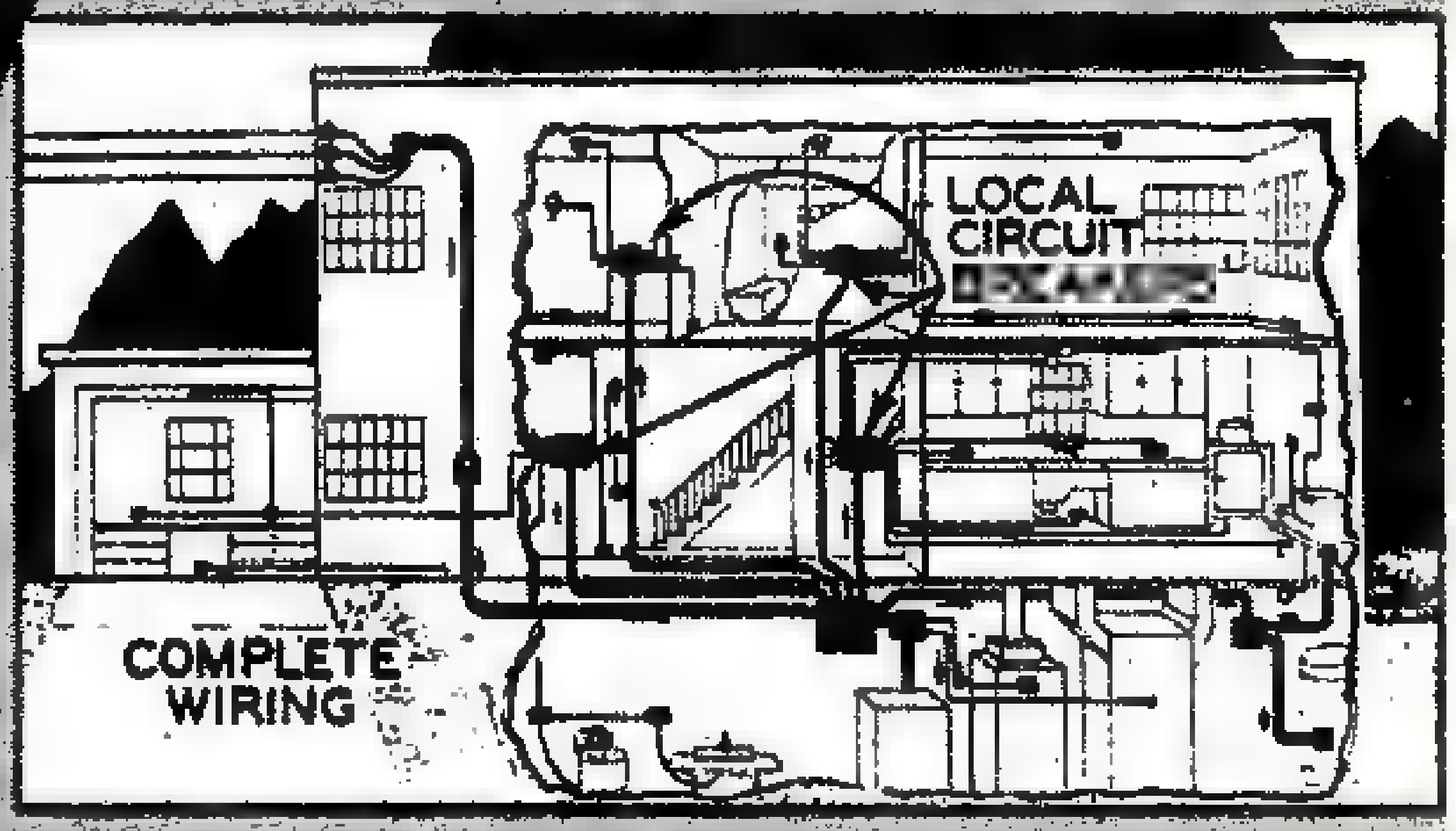
All-Electric Home Sets New Living Standard



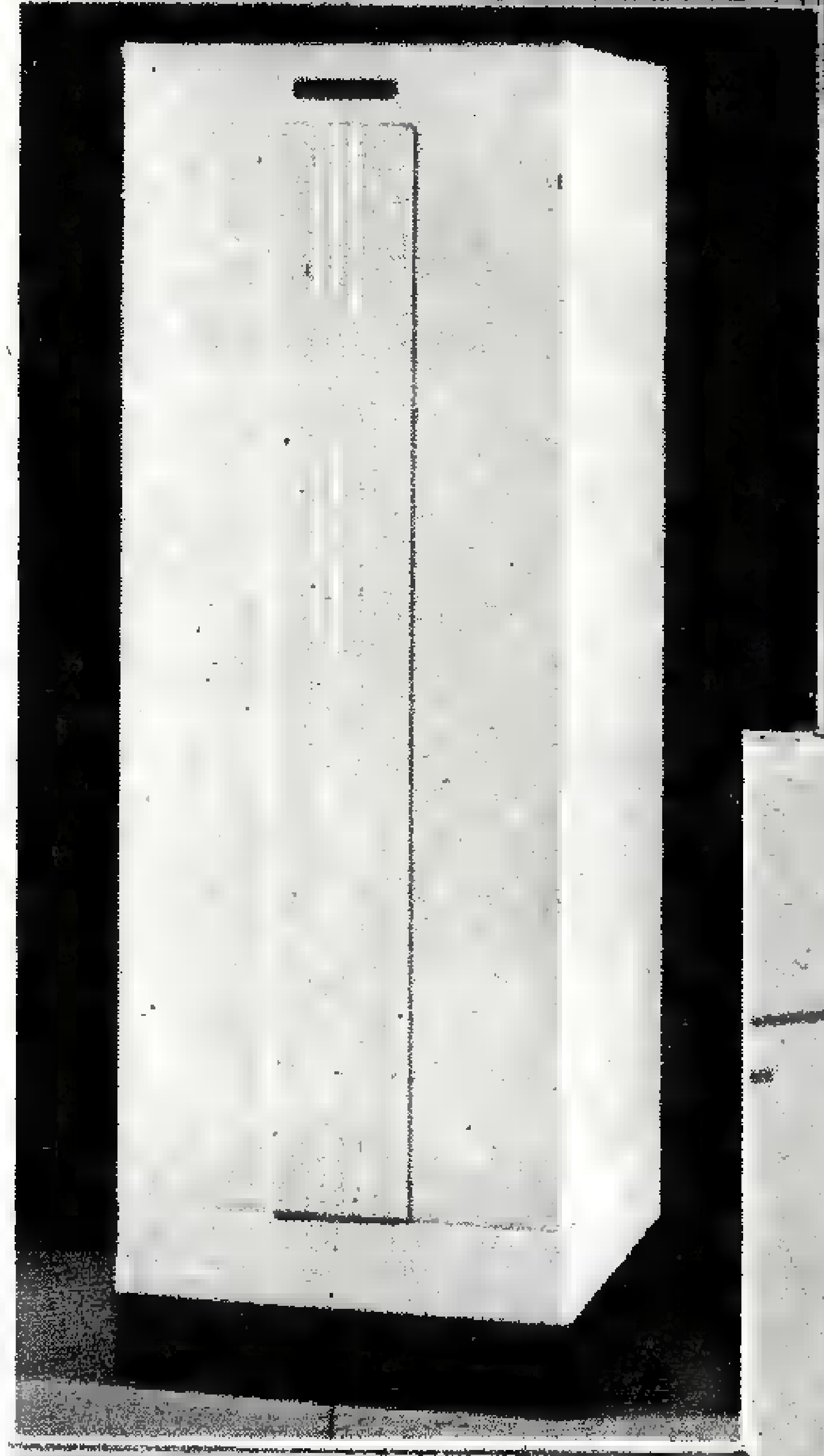
Here is the complete electric kitchen range. It contains [redacted] ovens for baking at high and low temperatures simultaneously. Lights illuminate the ovens when the doors are opened. A master clock can turn burners on or off at predetermined times and also time other electric appliances. The whole stove is stainless.



The increasing use of electric appliances has resulted in the overloading of ordinary home wiring. As a result, this new system has been developed. First the current needs of the whole house are estimated and the correct sized wire is run from the power lines to the totalizing unit, or general control box. Ranges, water heaters and other fixed equipment are then wired independently to the box.



Next feeder lines which supply the rooms with current are run to local circuit breakers. These breakers act as independent fuse boxes, and each one is affected only by the current being consumed by its own branch lines. The result is that no matter how many appliances may be operating on branch lines of [redacted] circuit breaker, the lights in the house do not dim or flicker, or the radio lose volume.



This modernistic, 40-gallon electric water heater sets flush with the wall in the modern kitchen. All wiring and plumbing is concealed in the base. Thermostats provide a temperature adjustment of 130 to 190 degrees. Right—Here is a corner of the all-electric kitchen. At left is the water heater, and at extreme right is the ice box.

PLANTS GROWN Without EARTH in SEALED BOTTLES

These plants are growing in sealed glass bottles without the use of natural soil. Miss Clara Hires, who created this odd form of plant growth, finds markets for her plants in all parts of the world.

RAISING all kinds of plants in sealed glass tubes and bottles is the unusual hobby of a former New Jersey school teacher, Miss Clara Hires. So extensive has become her work that several assistants are needed in order that the striking plant formations may be shipped promptly to all parts of the world. Educational authorities acclaim her for making it possible to study every stage of a plant's growth, including the roots.

Chemical soil is the substance which made the growing of bottled plants possible. Instead of growing the flowers in earth they are planted in a jelly-like substance which contains the vital growing chemicals and the necessary moisture. As soon as the roots begin to form around the seeds their growth may be followed through the transparent soil and later when the plants begin to shoot out they, too, may be examined daily.

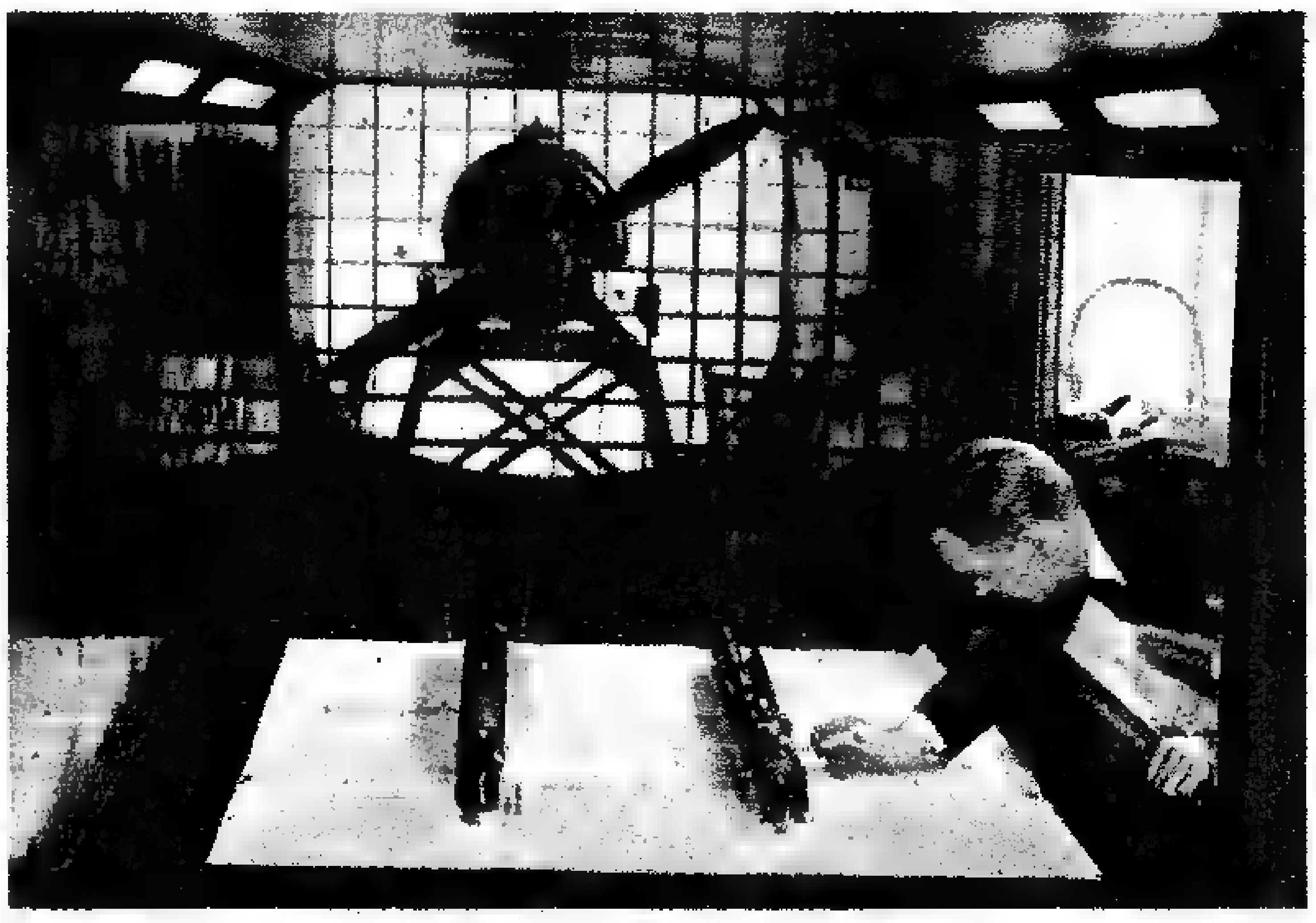
Being sealed, nothing is ever added to the bottle nor is it necessary to supply the plants with water as a process of condensation is in effect continually inside the bottle. With each change of temperature the mist rises, collects on the inside of the bottle and then rains back on the plant.

The plants are exposed to daylight, but not bright sunlight as the glass, acting as a lens, would burn up the plants in a few days. Miss Hires permits the plants to remain in the bottles until they are large enough to be set outdoors in natural soil.

Trains Tested In Wind Tunnel

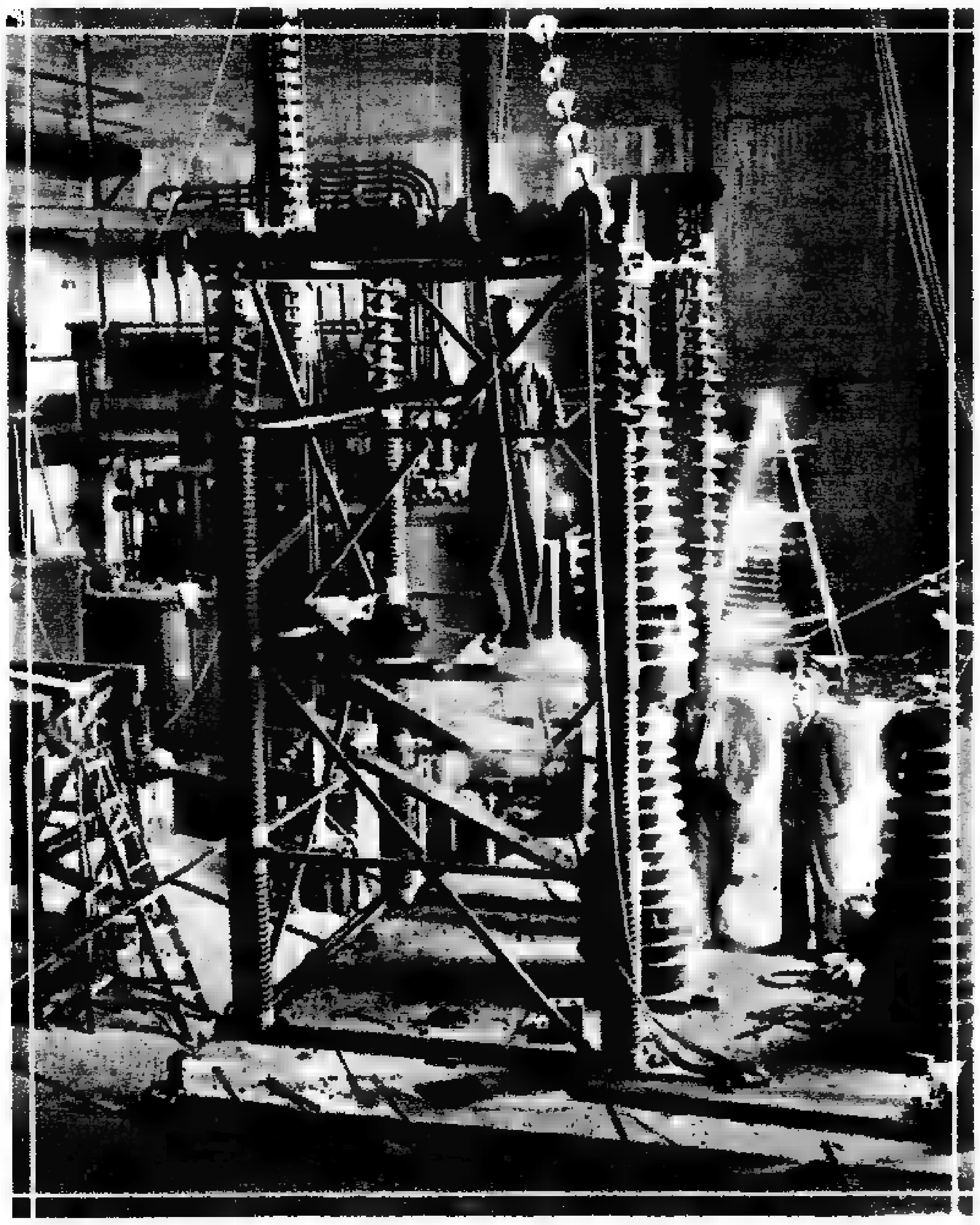
IN ORDER that British trains may run at maximum efficiency engineers of the London, Midland and Scottish Railway have constructed at their Derby locomotive works a wind tunnel for testing the various types of locomotives. The tunnel, the first ever to be constructed in England, is used to determine the best streamlining for the line's locomotives. Models which are exact replicas of the actual motive power are placed in the tunnel and a blast of wind, produced by an airplane propeller, is set in motion.

The models, supported on cords are pushed forward by the wind and streamling effects recorded.



This design engineer of one of England's leading railways is measuring the effects of wind on the speed of the different types of locomotive models to determine value of streamlining.

Science Makes Artificial Radium In Million-Volt Tube



Professor Lauritsen and his associates at the California Institute of Technology are shown before the giant tube used in making artificial radium from lithium, lightest metal known.

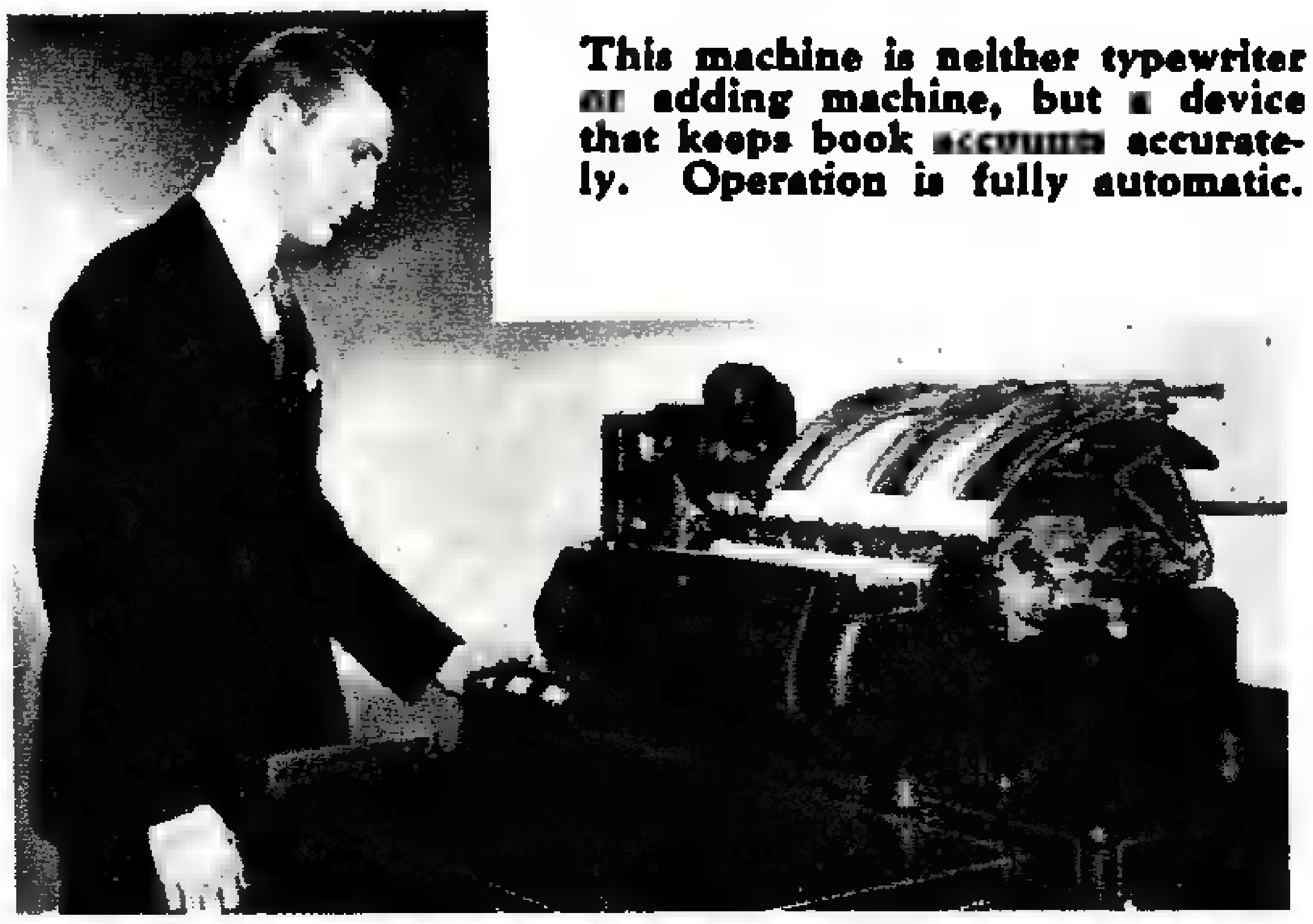
USING a tube carrying potentials of 1,000,000 volts Professor Charles C. Lauritsen and his research assistants at the California Institute of Technology have succeeded in producing artificial radium that is more powerful than the genuine metal. Dr. Lauritsen and his colleagues, Wilson Brubaker and Lewis Delsasso, using the lightest metal known, Lithium, transformed it into beryllium forming a metal with unusual energy producing properties.

The new metal, being even more powerful than radium itself, requires special care in handling as burns might prove harmful. Lead shields are used by the scientists so that they may study the metal and still be free from its effects. The actual radium, costing thousands of dollars to refine just a minute quantity, is in great demand by hospitals and clinics.

Robot Bookkeeper Actually Thinks

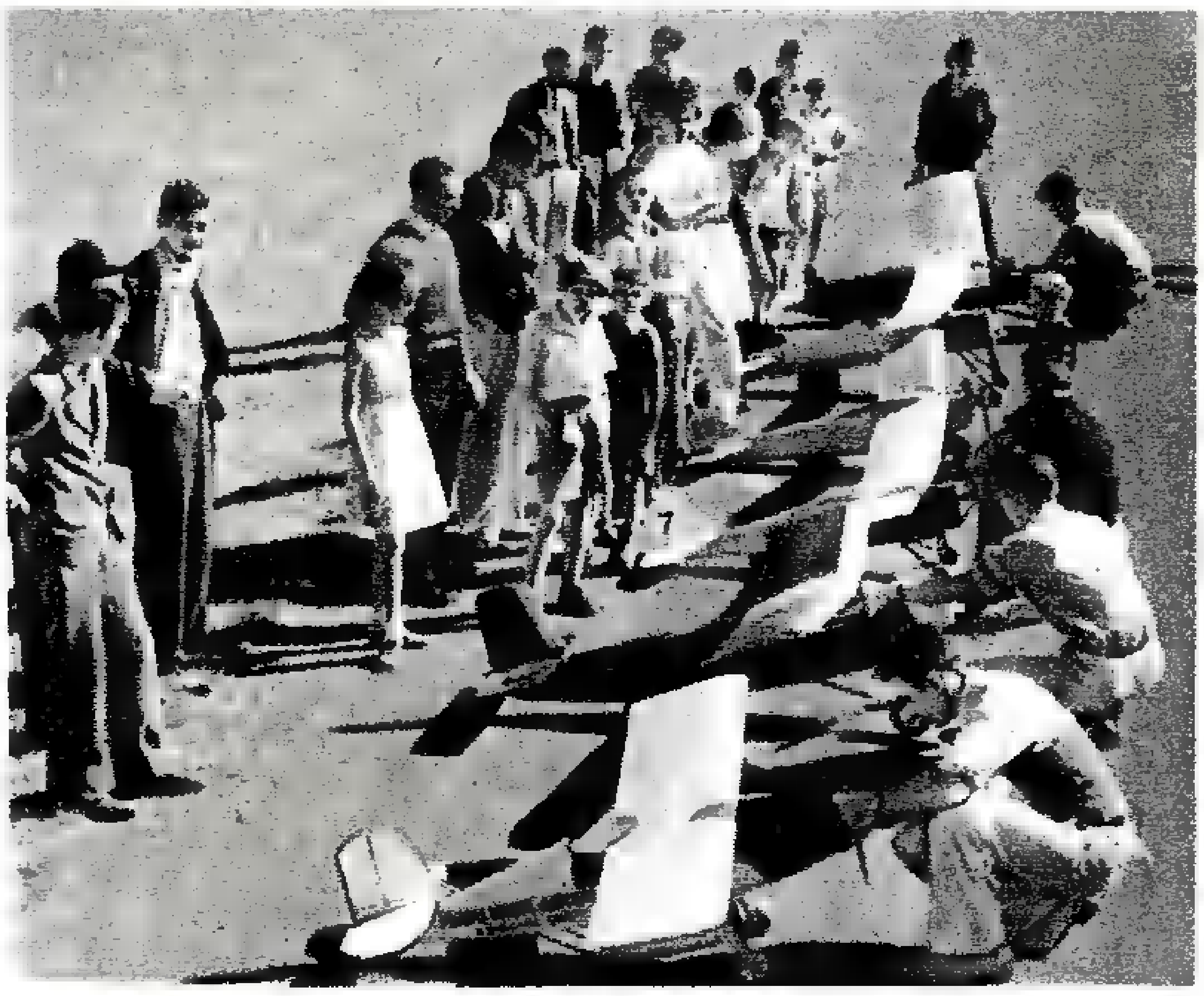
ELIMINATING all possible chance of errors occuring in bookkeeping and accounting a new machine, recently introduced in New York City, is far more accurate than any human being in keeping records. Special automatic mechanisms operated by electric motors handle the various accounts giving both sub and grand totals.

The machine which operates as a combination typewriter, adding and bookkeeping machine is expected to save users thousands of dollars through its elimination of errors.



This machine is neither typewriter or adding machine, but a device that keeps book accounts accurately. Operation is fully automatic.

Tiny Engines Propel Model Planes



Powered by miniature gasoline engines these model planes are lined up ready for a race near Miami, Florida. The planes are the handiwork of the youths shown preparing them for flight.

A FEW years ago model airplanes powered by rubber band motors were being entered in model airplane competition throughout the country. Most of these models are capable of making flights of very short duration only, but with the coming of the miniature gasoline engine all of this was changed.

Recently at Miami, Florida a model plane contest was staged in which all planes were built by youths under sixteen years of age and each being powered by midget gasoline engines. Many of the models remained aloft for more than one hour and could have continued in flight had it not been for the fact that they carried only a small fuel supply.

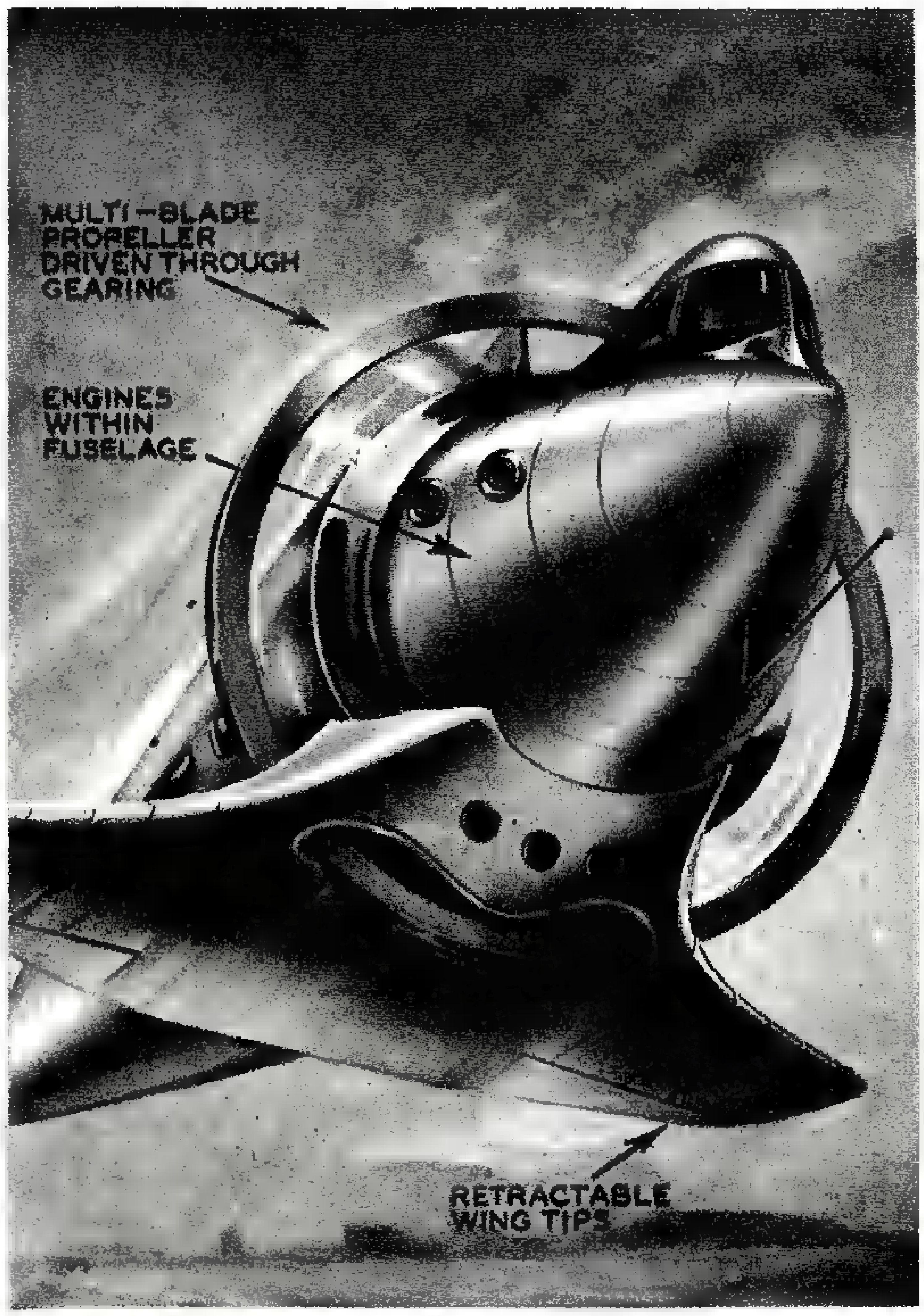
Super-Speed Turbo-Plane to Span Ocean

by DOUGLAS P. ROLFE

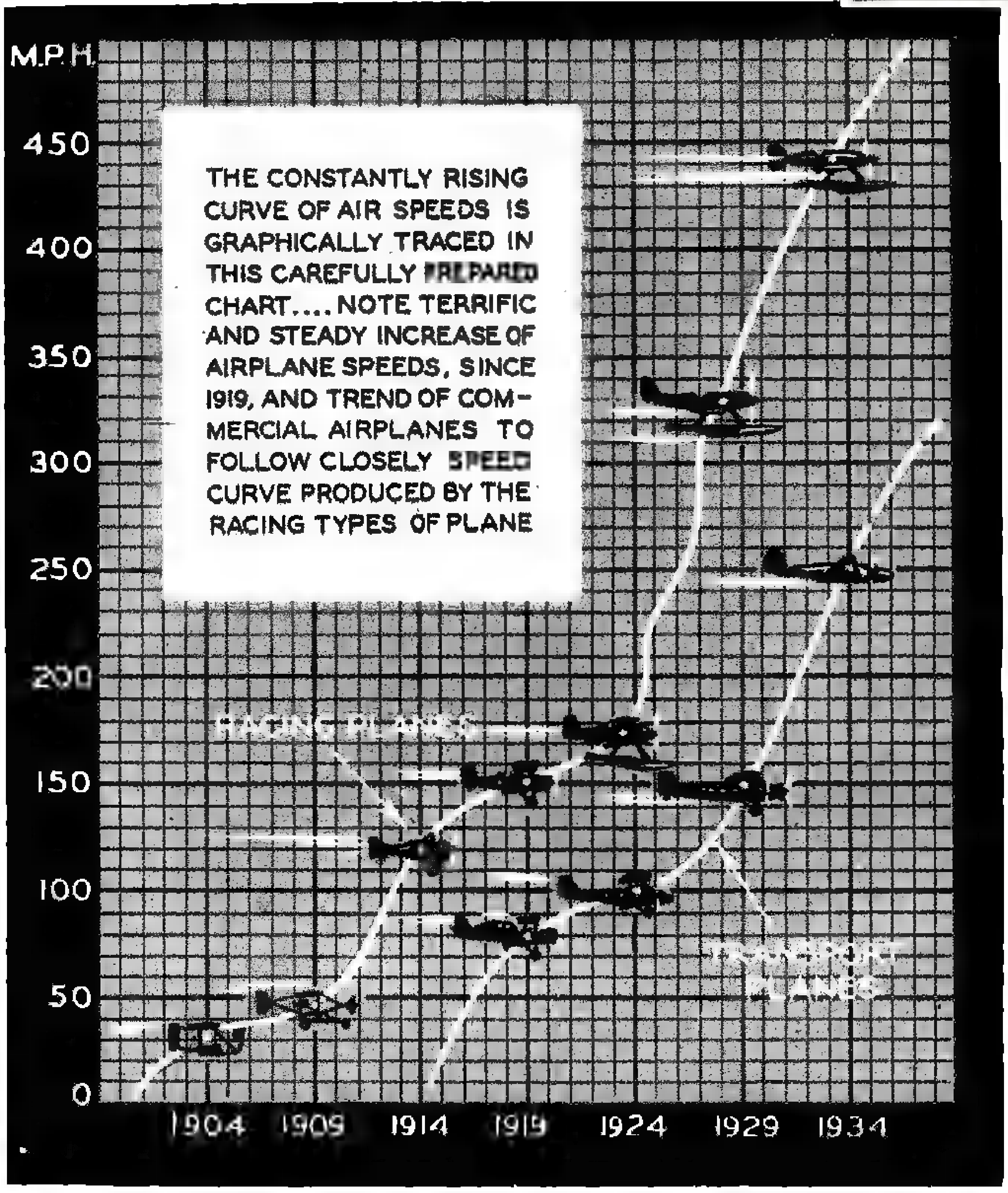
FIVE hours out of New York and the flasher lights of the Central London Air Terminal are blinking their welcome to the Trans-Oceanic express as it glides to a swift, effortless landing.

Five hours out of New York! This and similar pictures of future transportation have been painted ever since man first flew, but today it can be said that this is no idle fancy or paper prophecy. Even the most casual review of various activities in the United States, Great Britain and France show the vast number of experiments that are now being conducted towards this very end.

Whether the final success of trans-oceanic flying lies in the development of huge flying boats such as the *China Clipper,* or in some radically different type of boat is a question no truly progressive engineer would care to answer. This much they will say—that speeds of 500 miles an hour or more must be regarded as commonplace.



With wings reduced to a minimum this trans-oceanic plane is planned to span the Atlantic in five hours. In place of numerous motors blanketing over-sized wings, this craft uses a single power plant installed in the hull to drive a series of small, variable pitch blades constantly revolving about the circular ship.



Fantastic and dangerous as such speeds appear to us now, it must be remembered that 20 miles an hour was regarded as being equally dangerous not so many years ago. The entire history of the motor car and airplane has been one of increasing speed. Again; the history of car and plane alike points to the fact that speeds developed in racing models are rapidly transferred and absorbed by the commercial patterns. So swift has commerce been to adapt the lines of speed planes that today in the United States there is the extraordinary situation of regular air liners being miles faster than the majority of the world's best military pursuit planes.

Racing planes are now assault-

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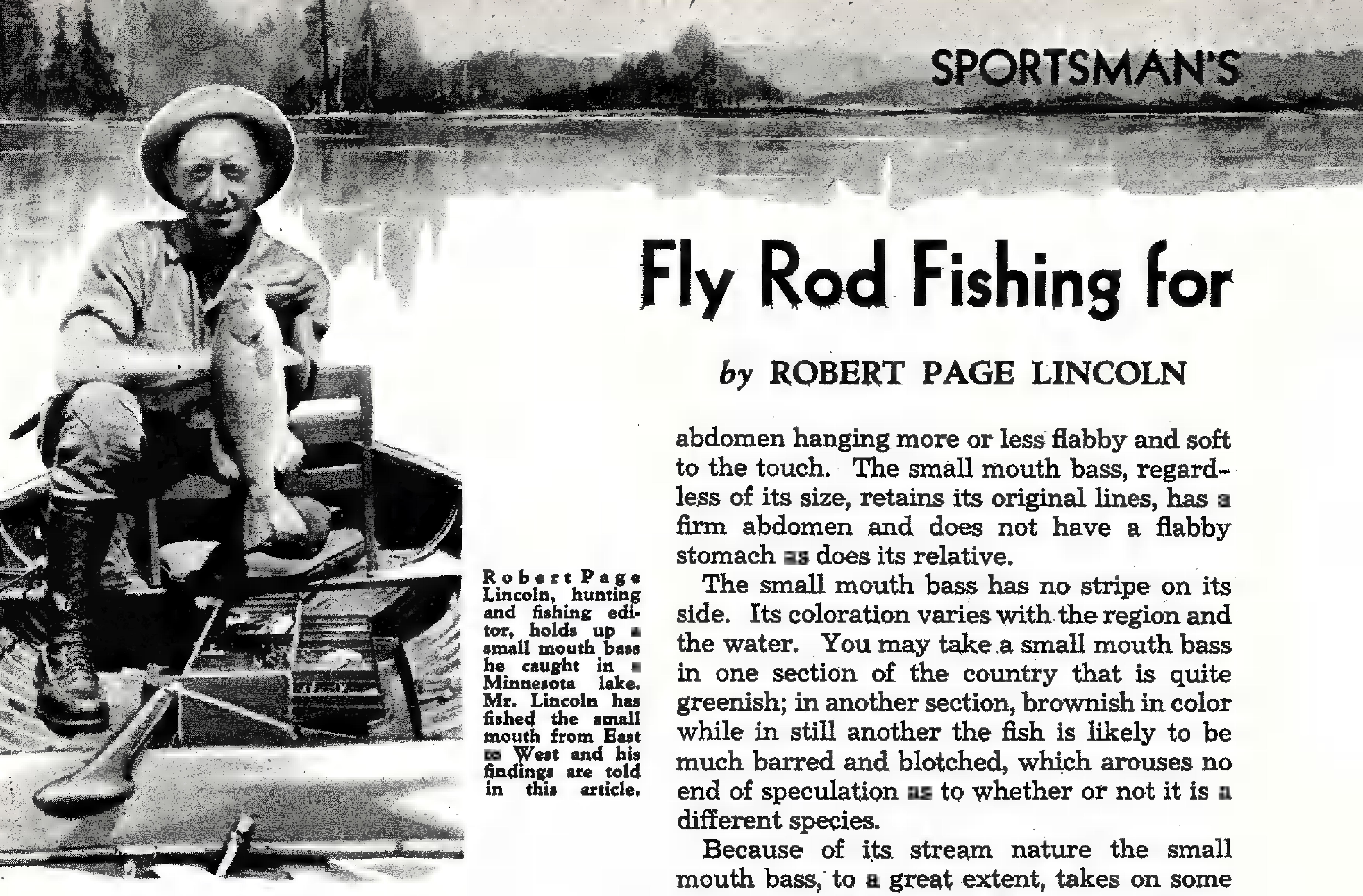


Robert Page Lincoln, hunting and fishing editor, holds up a small mouth bass he caught in a Minnesota lake. Mr. Lincoln has fished the small mouth from East to West and his findings are told in this article.

Fly Rod Fishing for

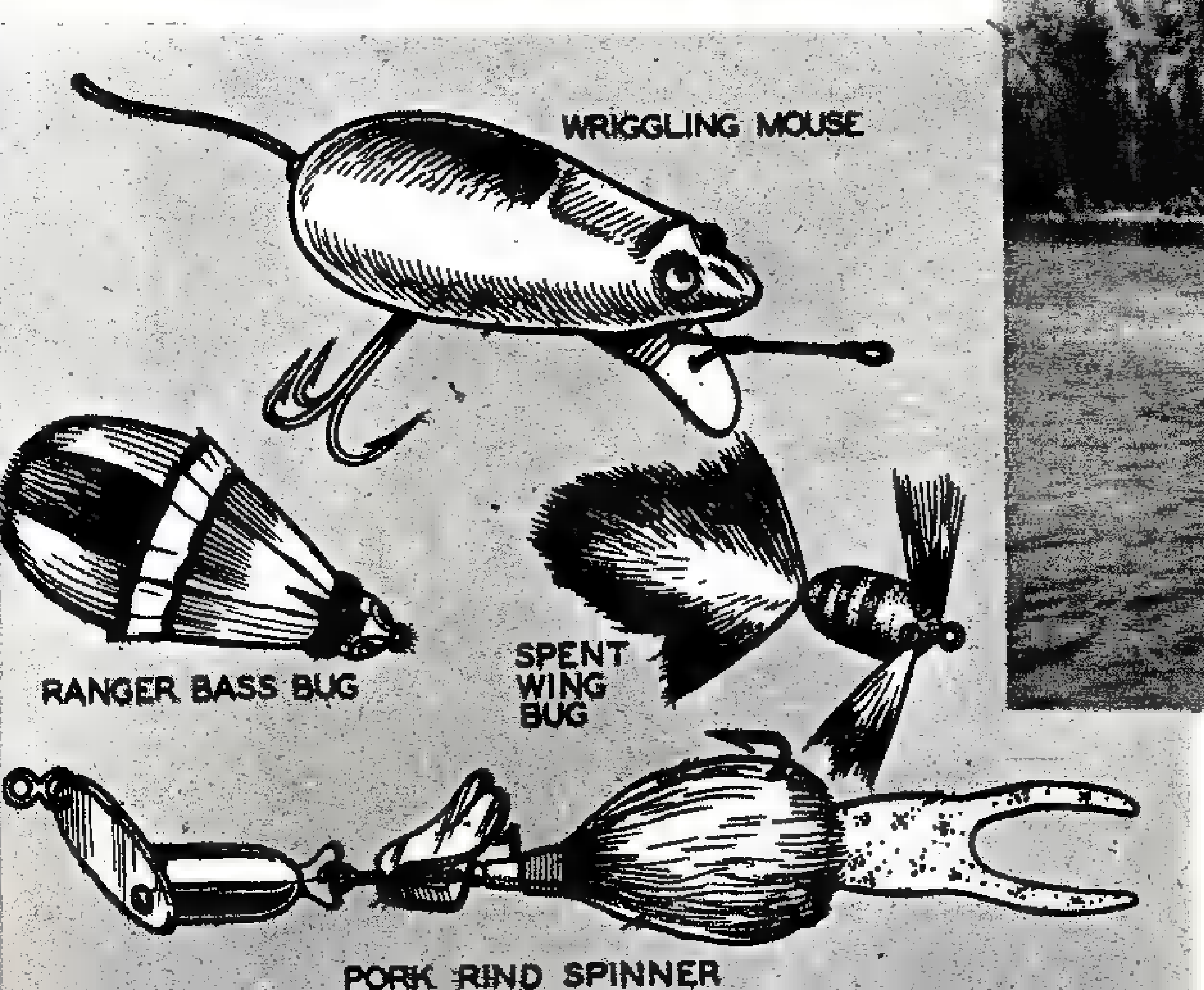
by ROBERT PAGE LINCOLN

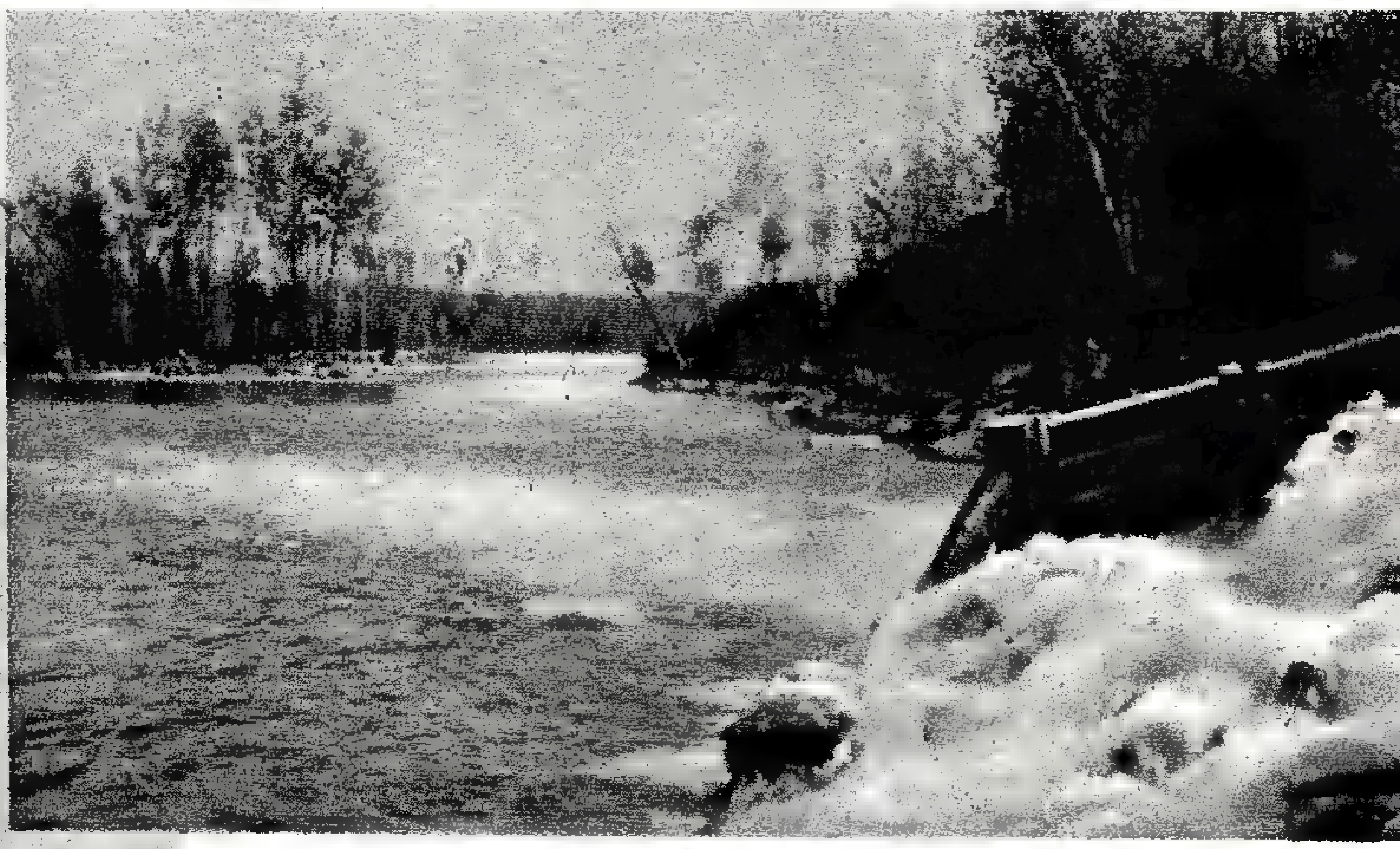
WHILE the large mouth black bass is generously distributed throughout the country, its close relative, the small mouth bass is likewise to be met in choice lakes and streams in the United States and Canada. Game and fish departments, recognizing the unusual gamey qualities of this species have extended the range into places where it was never found before. As a result small mouth bass are now being taken in great numbers west of the Mississippi, while previously they were found only in the East.

The small mouth bass is a firm, compact fish, with far more symmetrical lines than the large mouth. When a large mouth bass goes over three pounds in weight it will "belly down" as the saying goes, its abdomen hanging more or less flabby and soft to the touch. The small mouth bass, regardless of its size, retains its original lines, has a firm abdomen and does not have a flabby stomach as does its relative.

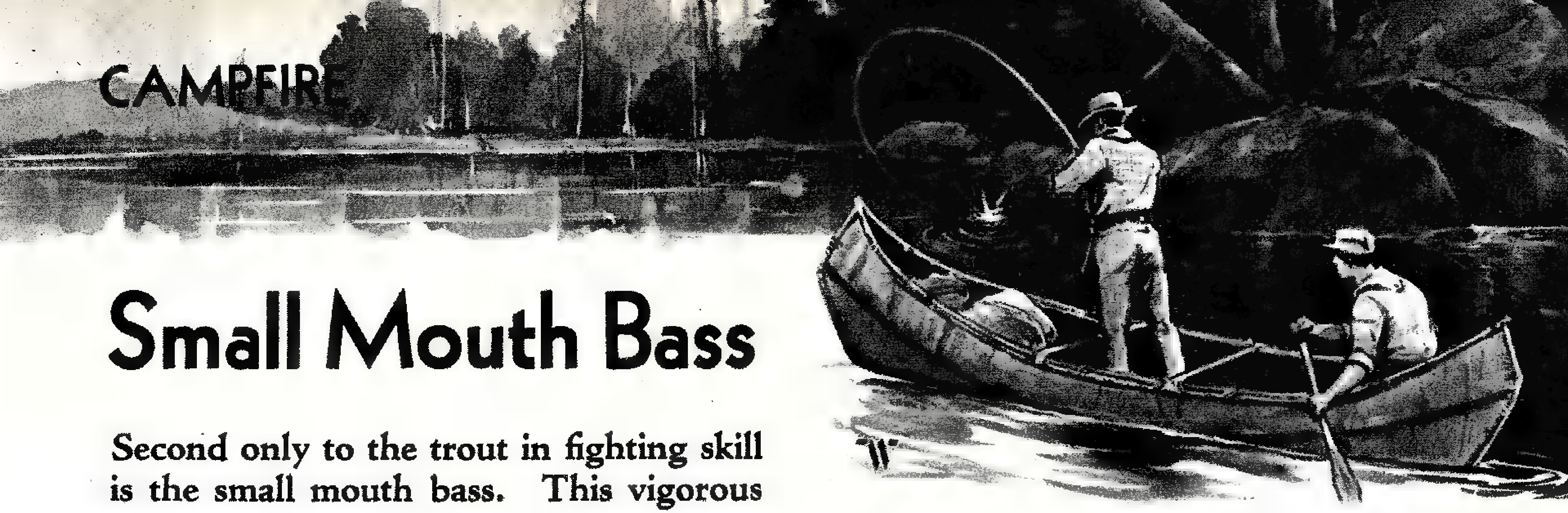
The small mouth bass has no stripe on its side. Its coloration varies with the region and the water. You may take a small mouth bass in one section of the country that is quite greenish; in another section, brownish in color while in still another the fish is likely to be much barred and blotched, which arouses no end of speculation as to whether or not it is a different species.

Because of its stream nature the small mouth bass, to a great extent, takes on some of the characteristics of the trout in that it feeds on insects along the shores very much as does the trout. By reason of this fact fly fishing has long been a favorite method of taking it. The flies used are generally tied to No. 1-0 hooks, the O'Shaughnessy hook bend, in the so-called hand-forged type, being the most desirable. These bass flies are made in the standard regulation variety, embracing such well-known patterns as the Grizzly King, Yellow Sally, Coachman, Royal Coachman, Professor, Red Hackle and many other colors and combinations of colors. Ninety per cent of the flies as used on the small mouth bass are





Above—Typical small mouth bass water. Like trout, small mouth thrive in fast water, though now, through planting, many are caught in lakes and ponds. Left—Here are some typical bass baits designed for the fly fisherman.



Small Mouth Bass

Second only to the trout in fighting skill is the small mouth bass. This vigorous warrior spells thrills galore for all fishermen. Prepare to land him by reading Mr. Lincoln's article now.

quite large, the No. 1-0 being the all-around size. There are times, however, when smaller flies will prove effective on many streams, especially where the water is clear. Such flies should range No. 3 to No. 6 in size.

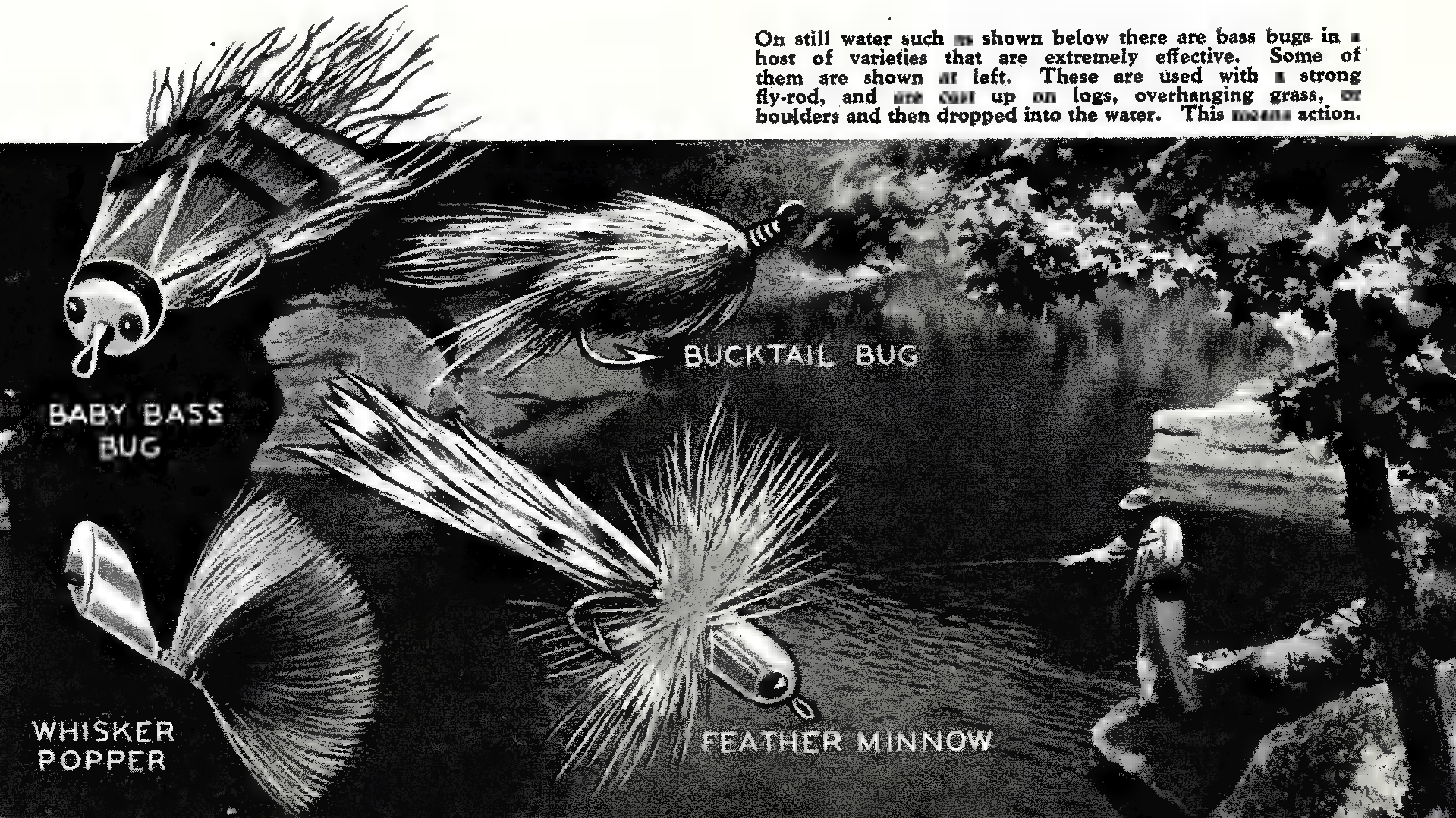
The best type of bass fly is one without any wing feathers, with just the hackles at the head of the fly, which, in the No. 1-0 size are an inch or more in length. A fly of this sort can be worked nicely in the water, and, with twitches of the rod tip, each individual hackle filament can be set into action, giving an open-and-close effect to the lure that is extremely life-like. As opposed to this, a fly possessing stiff, upstanding wings has little or no action to it at all, and merely turns and flops from side to side, imitating nothing and taking less.

Bass flies in the No. 1-0 size and in regulation patterns are often used in combination with a small No. 2 gold or nickel-plated spinner on a shaft. By reason of the interchangeable snap-fasteners or sliding coil-fasteners on these shafts you can take off one fly and put on another in a few seconds time. Regardless how flies are used when fished without the spinner arrangement, those having stiff, erect wings are out of the question when used with spinners. The wingless, hackle or palmer type of fly works most effectively with the spinner arangement, and is to be highly recommended. By way of explanation, a hackle type of fly such as the Brown Hackle has hackles concentrated at the head of the fly only, with the body bare. In the Palmer type the hackles are distributed along the whole body, the same fairly bristling with these filaments. Both of these types are to be given first place among flies as used on small mouth bass in fly fishing. Combined with the tiny spinner, the fly of either variety is ideal and most effective.

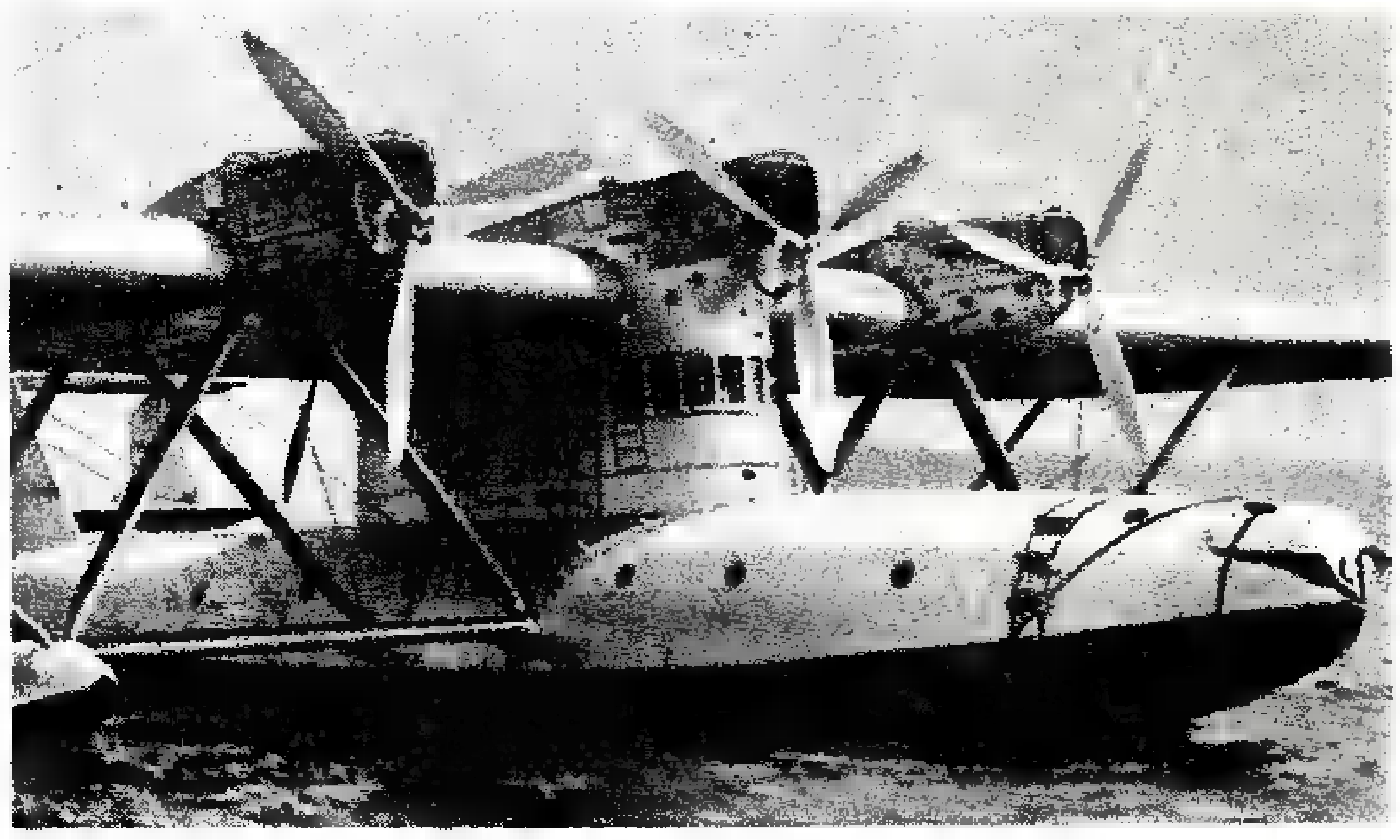
Lures for the small mouth bass as used by means of the fly rod are many and various. Aside from the spinner and regulation bass flies, as used under the water surface, there are bass bugs of many kinds. These bass bugs have cork bodies and float. They are less

[*Continued on page* 128]

On still water such as shown below there are bass bugs in a host of varieties that are extremely effective. Some of them are shown at left. These are used with a strong fly-rod, and are cast up on logs, overhanging grass, or boulders and then dropped into the water. This means action.



French Mail Planes Cross South Atlantic On 3-Day Schedule



Here is the *Santos Dumont,* first of the heavier-than-air trans-Atlantic mail carriers. It carries mail from Europe to South America in 3 days, covering more than 9,000 miles.

TRANS-ATLANTIC air mail service by heavier-than-air craft, anticipated in the near future for the North Atlantic, has been placed in operation between France and Brazil by the French. The new service provides three-day service between the two continents.

The trans-Atlantic mail planes run on weekly schedule, picking up mail from France and England and delivering it to Rio de Janeiro and Buenos Aires three days later. The trans-Atlantic plane makes connections with the South American trans-continental plane, and letters from London reach Santiago on the west coast of Chile within 4 days.

The total length of the new mail route is 9,365 miles, of which 2,300 miles is directly across the Atlantic. The great flyingboats are powered with three motors equipped with triple bladed propellers.

Next 4 Years To Be Wet and Colder

COLD winters and wet summers is the forecast for the next four years according to H. H. Clayton of Canton, Mass. Mr. Clayton, who predicted the drought of the past five years, and the extreme cold of the present winter, bases his predictions upon the cycle of solar activity as indicated by sun spots.

Cocoanut Novelties Prove Profitable

BUTTONS and buckles of cocoanut shells have provided a profitable sideline for Pierre Bouchard of Miami, Fla. For tools he uses only a pocket knife and a set of files.

An interesting variety of colors ranging from ivory white to a rich mahogany may be produced by selecting cocoanuts in various stages of ripeness. The shells must be left to season in the sun until all of the natural oil has been baked into the fiber. A soft hand-rubbed finish brings out the beautiful colorings left by the oil.

Only a knife and a few files are needed to make profitable novelties out of cocoanut shells, Pierre Bouchard has discovered.

President Has "Official Forger"

Louise Polk Wilson is the "official" forger of President Roosevelt's signature. She is the only one authorized to sign his name and she has done so more than 11,000 times.

AUTOGRAPH hunters and hobbyists who have discovered President Roosevelt's signature upon certain patents of the General Land Office will find they have the only "official" forgeries of the President's signature in existence. Miss Louise Polk Wilson of that office, namesake of two presidents, is the only person who has been authorized by the Chief Executive to sign his name.

What New Inventions Are Needed?

$50.00 in CASH PRIZES

FOR BEST IDEAS

FIRST PRIZE	$25.00 IN CASH
SECOND PRIZE	10.00 IN CASH
THIRD PRIZE	5.00 IN CASH
THREE FOURTH PRIZES . . .	2.00 EACH
FOUR FIFTH PRIZES	1.00 EACH
TOTAL—10 PRIZES . .	50.00 IN CASH

FOR years this magazine has been publishing in its Needed Inventions Department the germs of ideas which are now yielding their inventors thousands of dollars in royalties. Some who are profiting from these suggestions are professional inventors, but more often than not some reader who had never before invented a thing would discover the solution and profit accordingly.

Inventions breed inventions. The invention of the locomotive led to the development of the automobile, street car, and ultimately the airplane, the progress of each being accompanied by thousands of contributing inventions. Everyone has ideas on how these can be improved further, and inventors want your ideas. You will want other readers' ideas.

To make this exchange of ideas still more interesting, Modern Mechanix & Inventions Magazine will award $50 each month for the best suggestions for needed inventions. First prize will be $25, with nine other cash prizes as listed above. The rules are simple and are listed at the conclusion of this article.

Your needed invention can cover any field, and the simpler it is, the better. As an example, this month there are described a few simple needs for milady's dressing table. You

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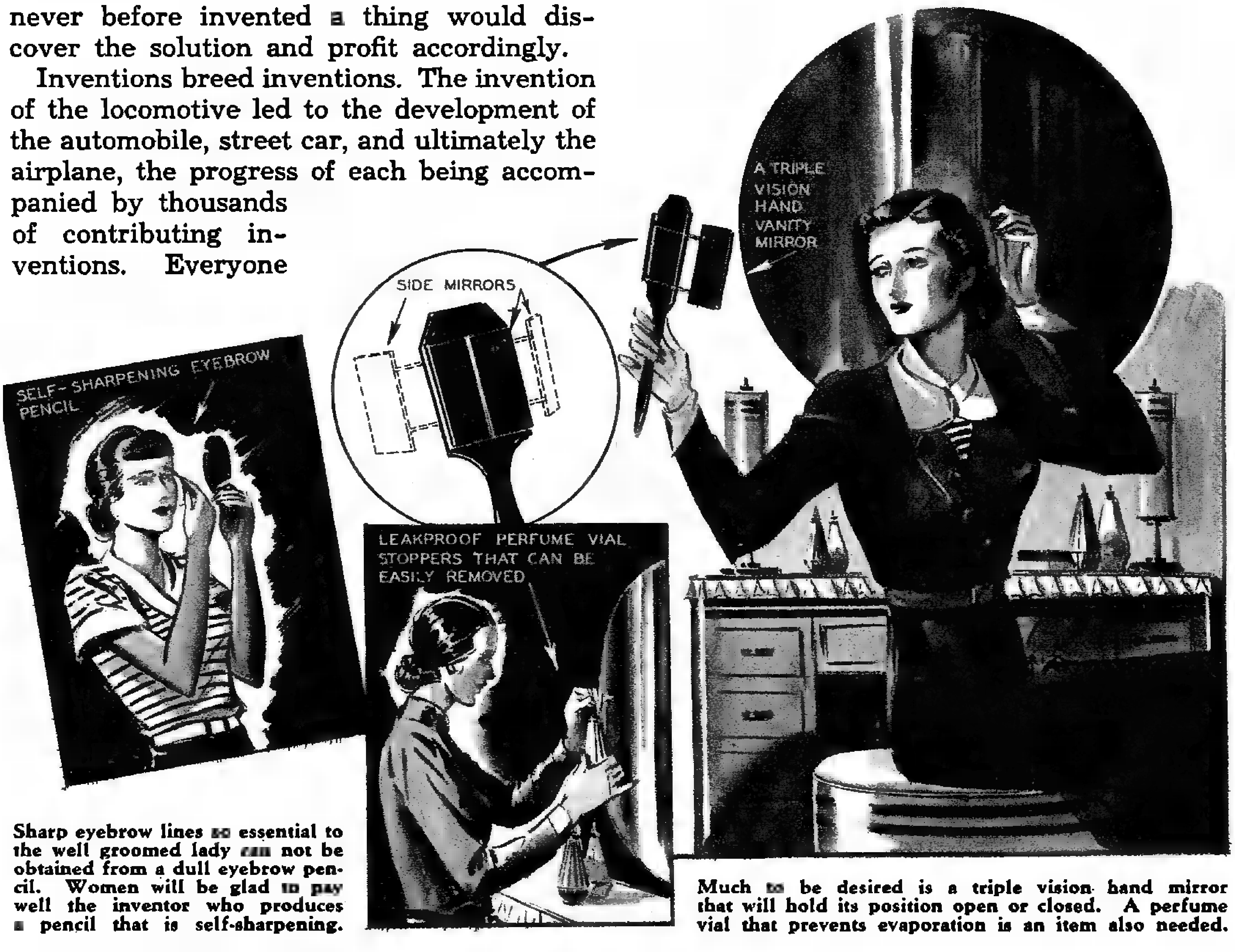
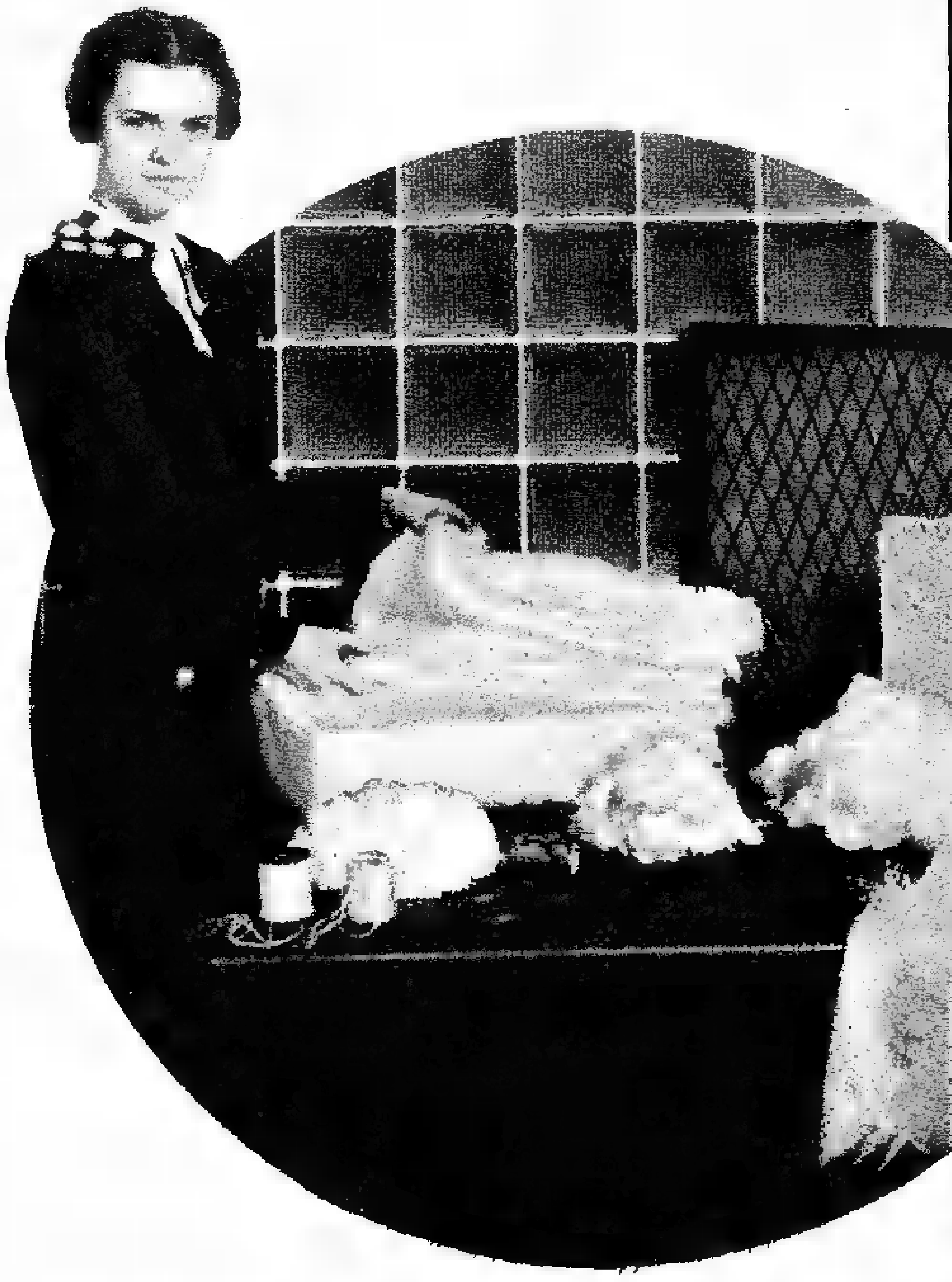

A TRIPLE VISION HAND VANITY MIRROR
SIDE MIRRORS
SELF-SHARPENING EYEBROW PENCIL
LEAKPROOF PERFUME VIAL STOPPERS THAT CAN BE EASILY REMOVED

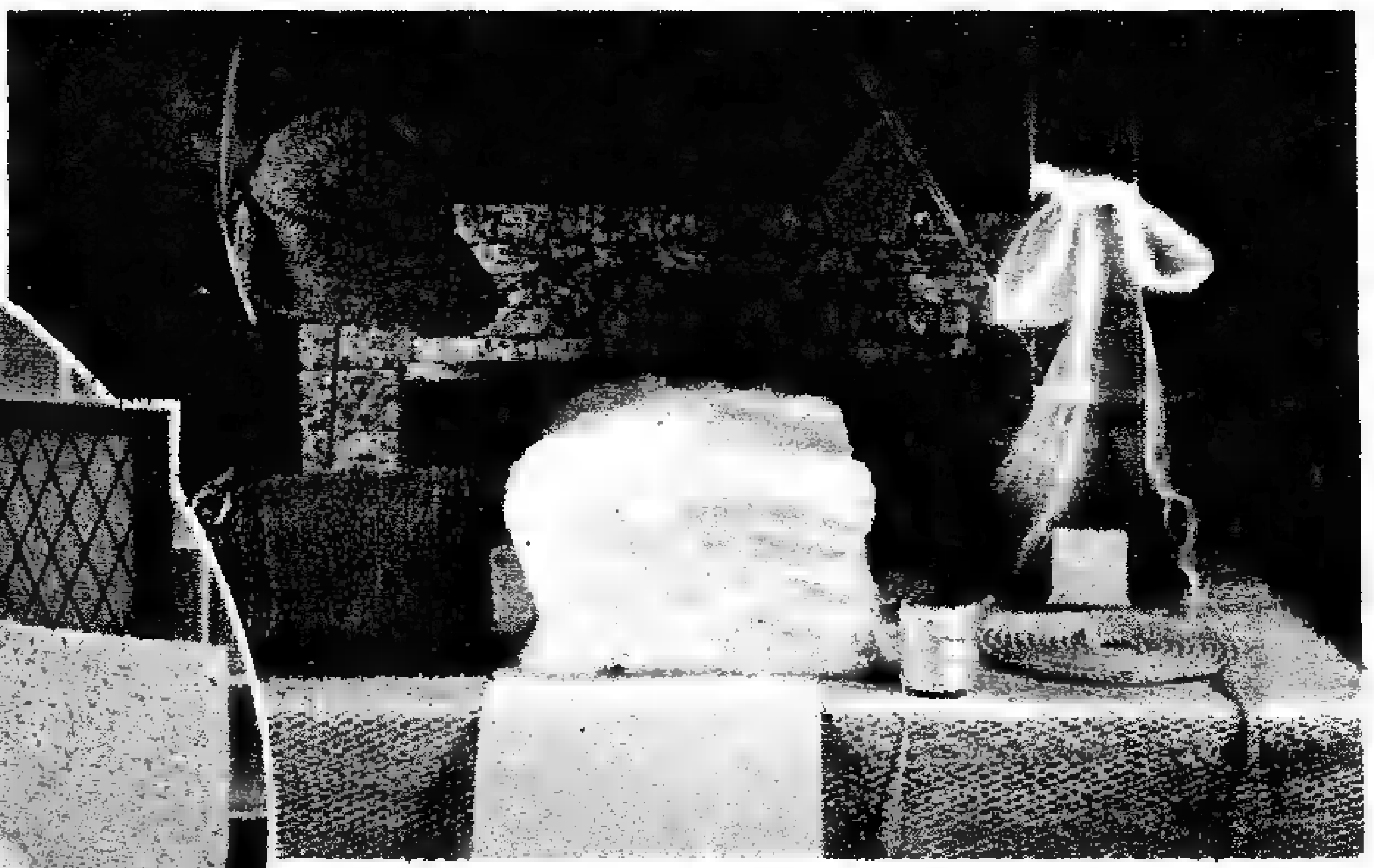
Sharp eyebrow lines so essential to the well groomed lady can not be obtained from a dull eyebrow pencil. Women will be glad to pay well the inventor who produces a pencil that is self-sharpening.

Much to be desired is a triple vision hand mirror that will hold its position open or closed. A perfume vial that prevents evaporation is an item also needed.

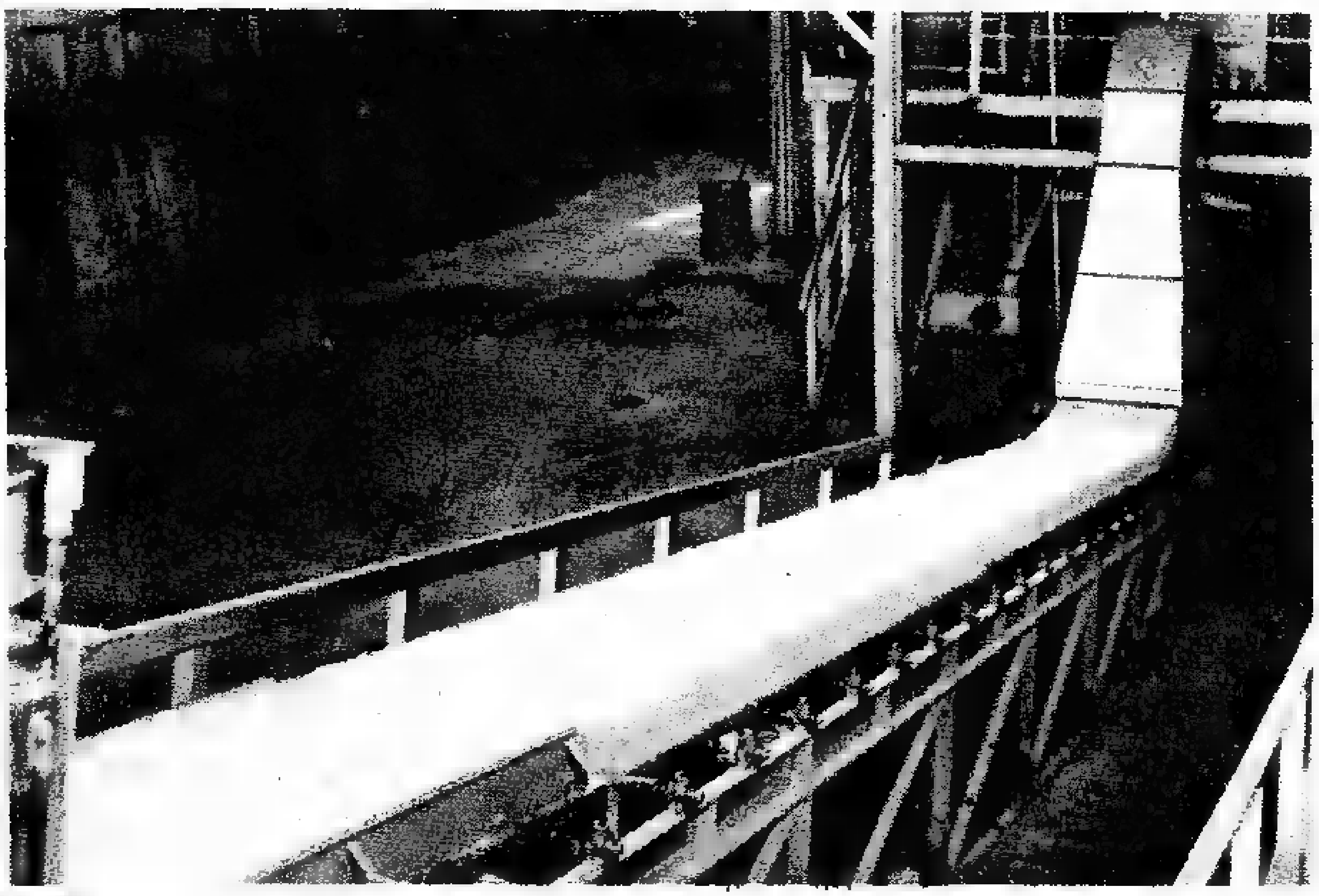
Glass Fabrics Startle Fashion Experts



Few would guess that the fluffy batting held by the young lady was made of glass. But it was, and so were the spools of yarn, the woven mat, the bundles and block of insulating material and the screened air filter. Even the wall is made of glass.



Here are some more glass products. The hat is knitted of blue glass as was the hand bag. At the left is a ball of glass yarn, and to the right of the glass "pillow" is a spool of thread and a coil of glass rope. The woven rug is made of glass also.



Here the glass batting emerges from the spinner. In the new process glass fibres are drawn at the rate of 260,000 feet a minute, more than 200,000 feet a minute faster than a rifle bullet. This batting has remarkable acoustical properties, and also can be used in this form for home insulation.

This is not snow but glass, the same kind from which bottles are made. One pound of this substance contains enough fibres to reach around the world. Each strand is 1/20th the diameter of a hair; 100 are needed to make No. 50 thread.

FOR centuries the glass industry was content to make windows, tableware, and lenses. There was little else to be done, as glass was "too hard and brittle" for other purposes, in the opinion of most observers. Suddenly, however, modern science has changed all that.

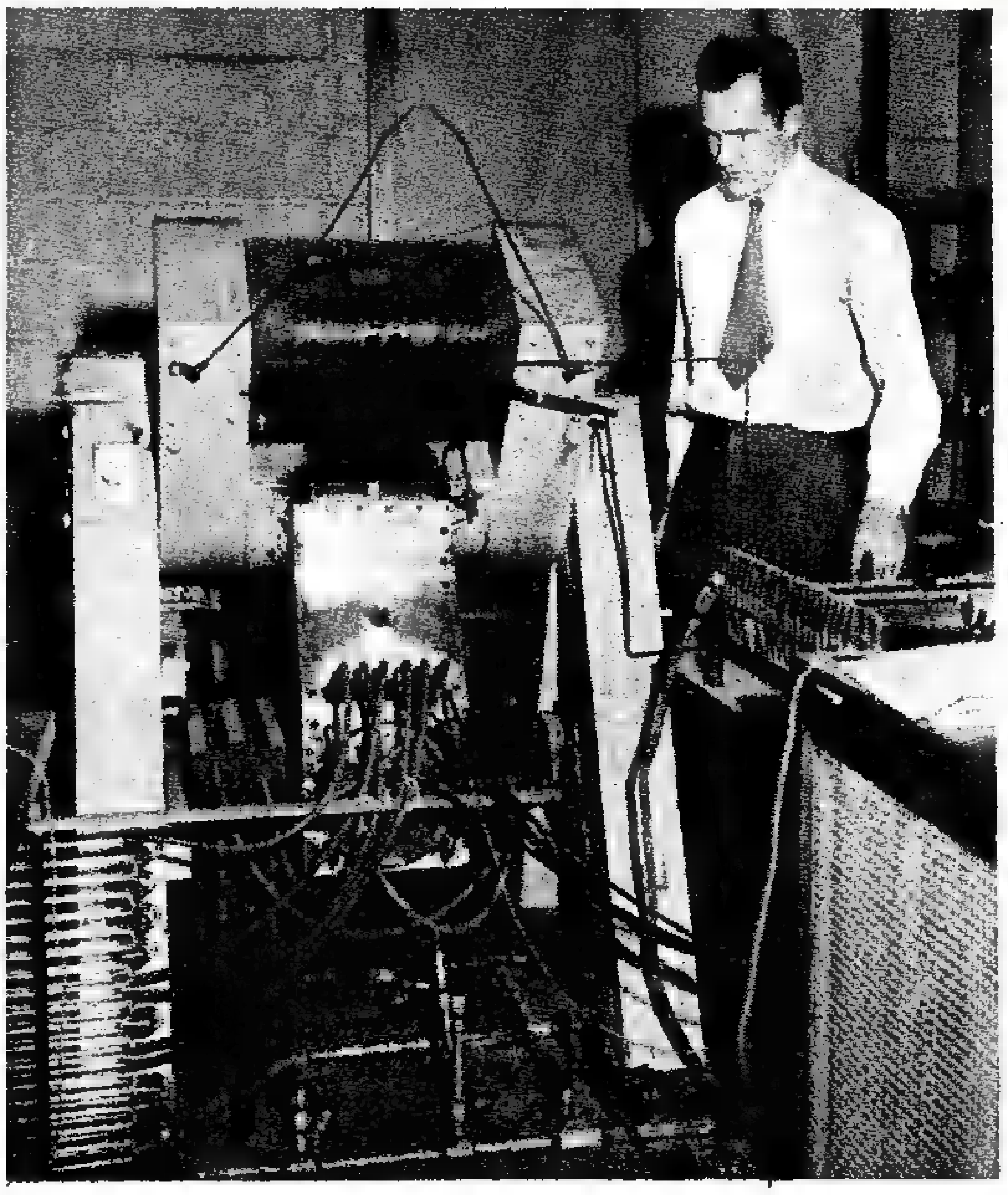
Within the past 12 months glass has been made strong and resilient enough to make diving boards; glass blocks as strong as mortar have been used to make factories; glass cooking utensils have resisted the heat of open flame, and now comes a glass soft enough to be spun as yarn or thread.

Glass clothes are no longer an improbability. Already it has been woven into hats, rugs, shawls, insulation for wires, and ropes.

Atomic Twins Separated To Form World's Smallest Solids

THE determined assaults made by science upon the atom within the past year have opened entirely new fields to the experimenters, and it is expected that the next 12 months will find the mystery of atomic structure entirely dissipated.

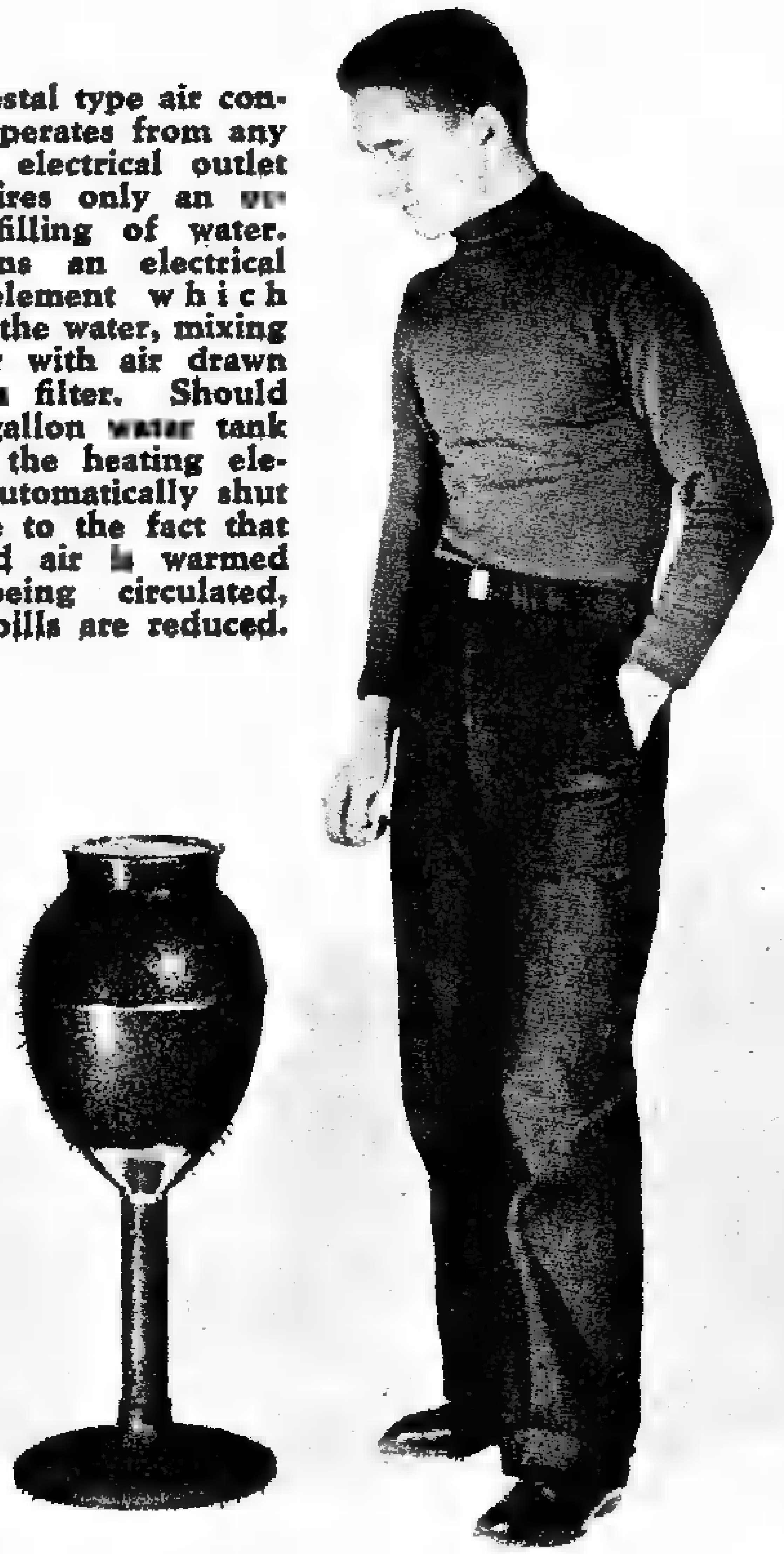
Following close upon the heels of the newly perfected atom-smashing cyclotron comes a device from the Bartold Research Laboratory at Swarthmore, Pa., to separate atomic twins. Dr. L. H. Rumbaugh is the inventor. In this machine the electrons and pretons are separated to form the smallest, lightest bodies on earth. It will be used to further atomic research in fields hitherto untouched by scientific experimenters.



Here is the latest machine developed to study the action of the atom. It separates atomic twins, producing the smallest solids on earth. It was invented by Dr. L. H. Rumbaugh.

Small Air Conditioner Saves Fuel

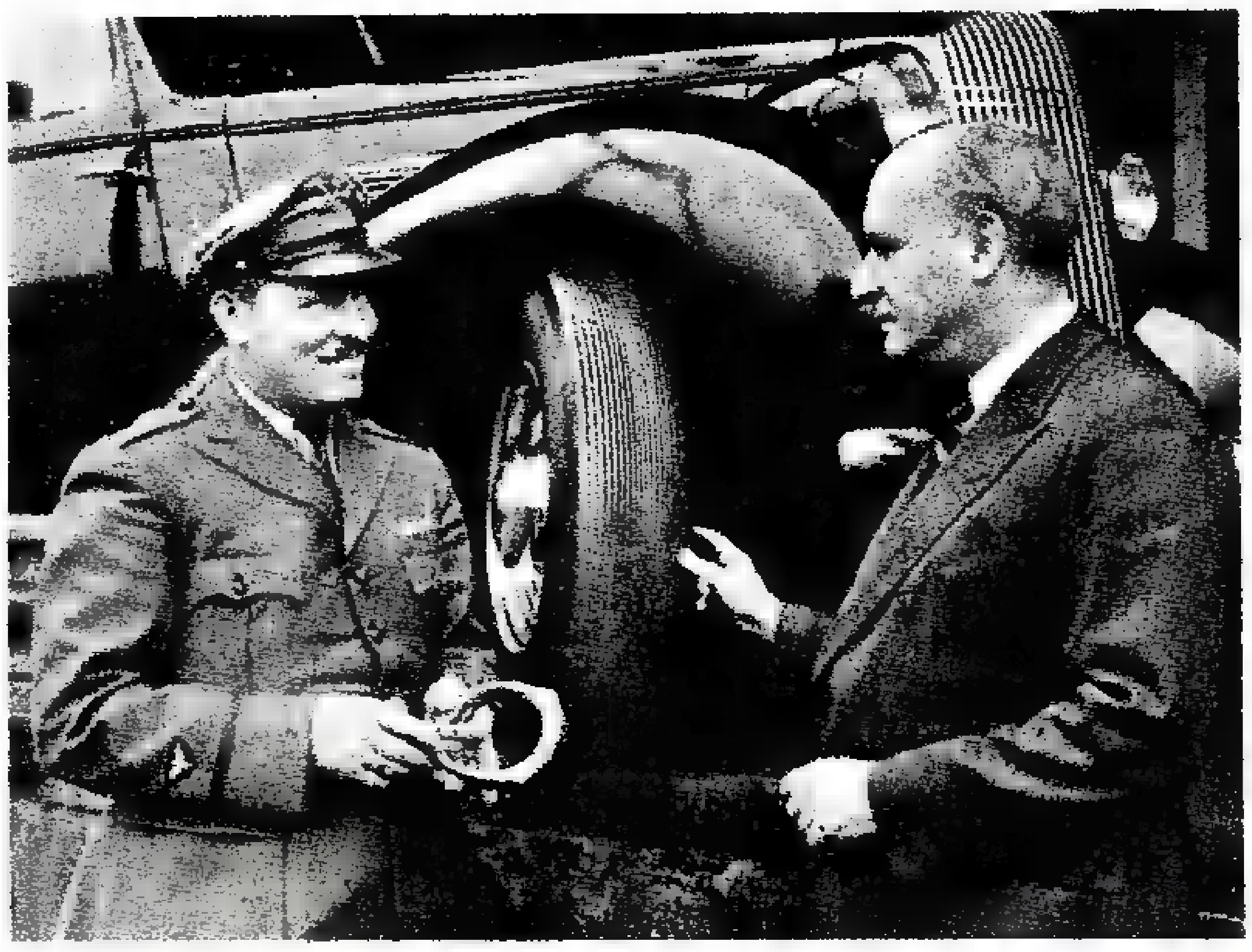
This pedestal type air conditioner operates from any 110 volt electrical outlet and requires only an occasional filling of water. It contains an electrical heating element which vaporizes the water, mixing the vapor with air drawn through a filter. Should the 1½-gallon water tank run dry, the heating element is automatically shut off. Due to the fact that humidified air is warmed before being circulated, the fuel bills are reduced.



A PORTABLE air conditioner has been produced which can deliver filtered, washed air with no attention other than an occasional filling with water. It operates from any electrical outlet. Air is drawn through a filter, mixed with a steam vapor created by an electric heating element and circulated through the room with a fan.

Thin Vanes Form Non-Skid Tread

RUBBER fins which remained on a tire long after the treads had worn out provided the clue which led tire engineers to develop a new type of tread composed of thin rubber vanes. The vane treads fold over upon encountering an obstacle, thus saving wear on the tire. Quite by accident it was found that this folding action stopped car 25 per cent faster than any other type of tread. On curves the vanes lean sideways, giving more traction.

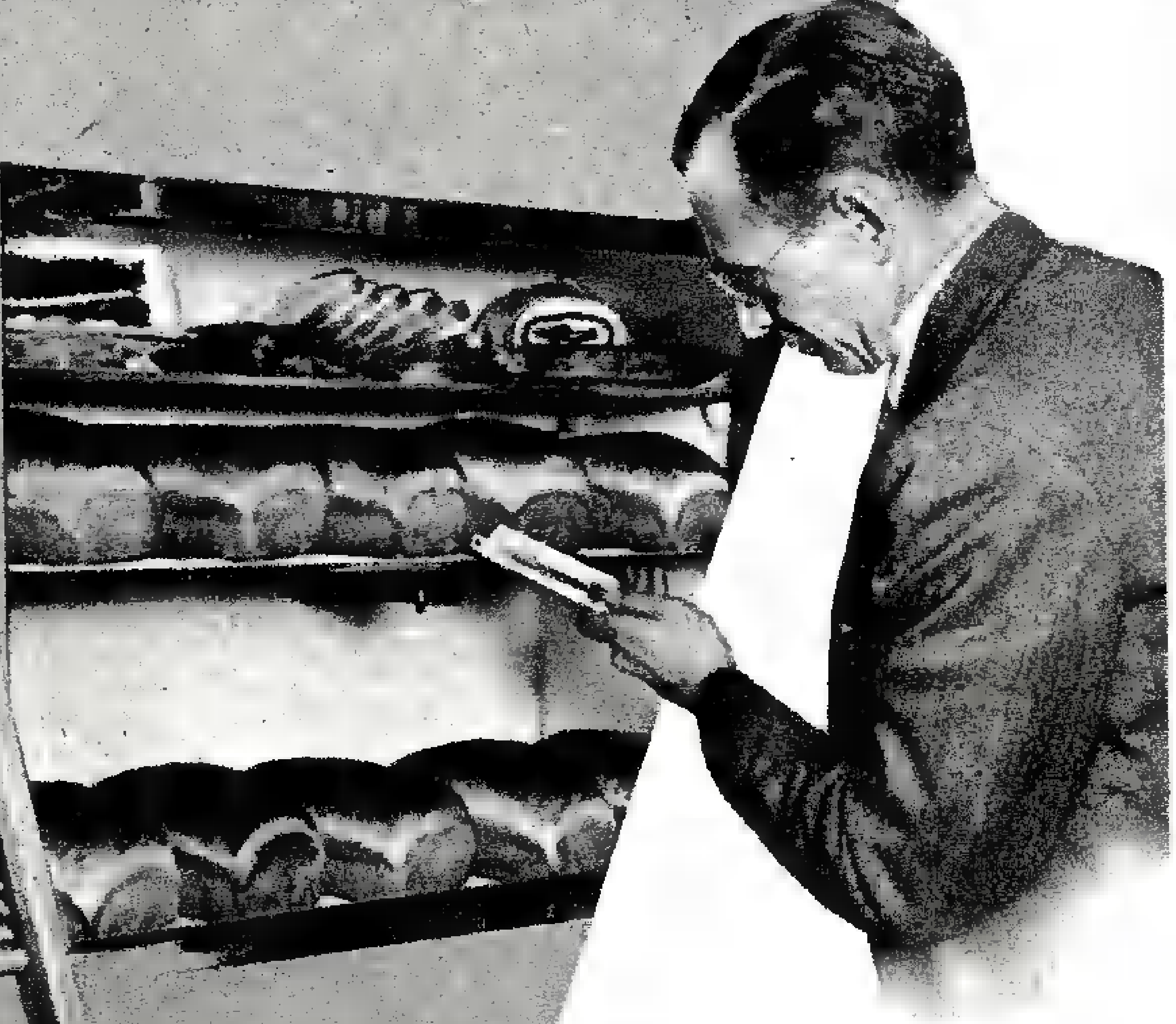


Col. Roscoe Turner, famous speed flier, is shown here examining the latest type of tire tread. The thin rubber vanes of this tire form a serpentine tread when brakes are applied.

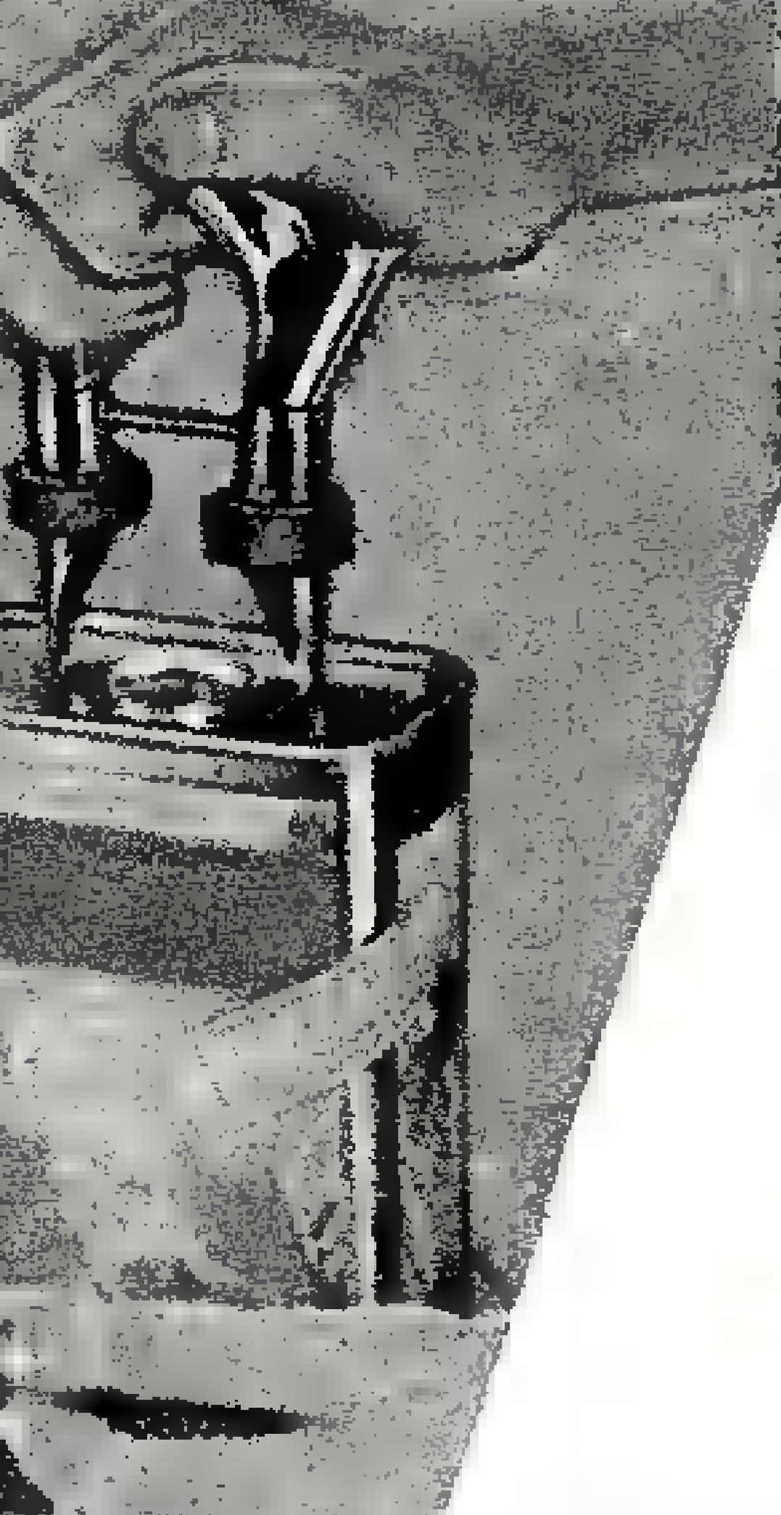
Home Scientists *Banish* Wash Day Blues

WRINGER BOARD
WASH AND WRING
WONDER LABOR SAVER
No. 502
WOOD-TEX, Inc. NEW YORK

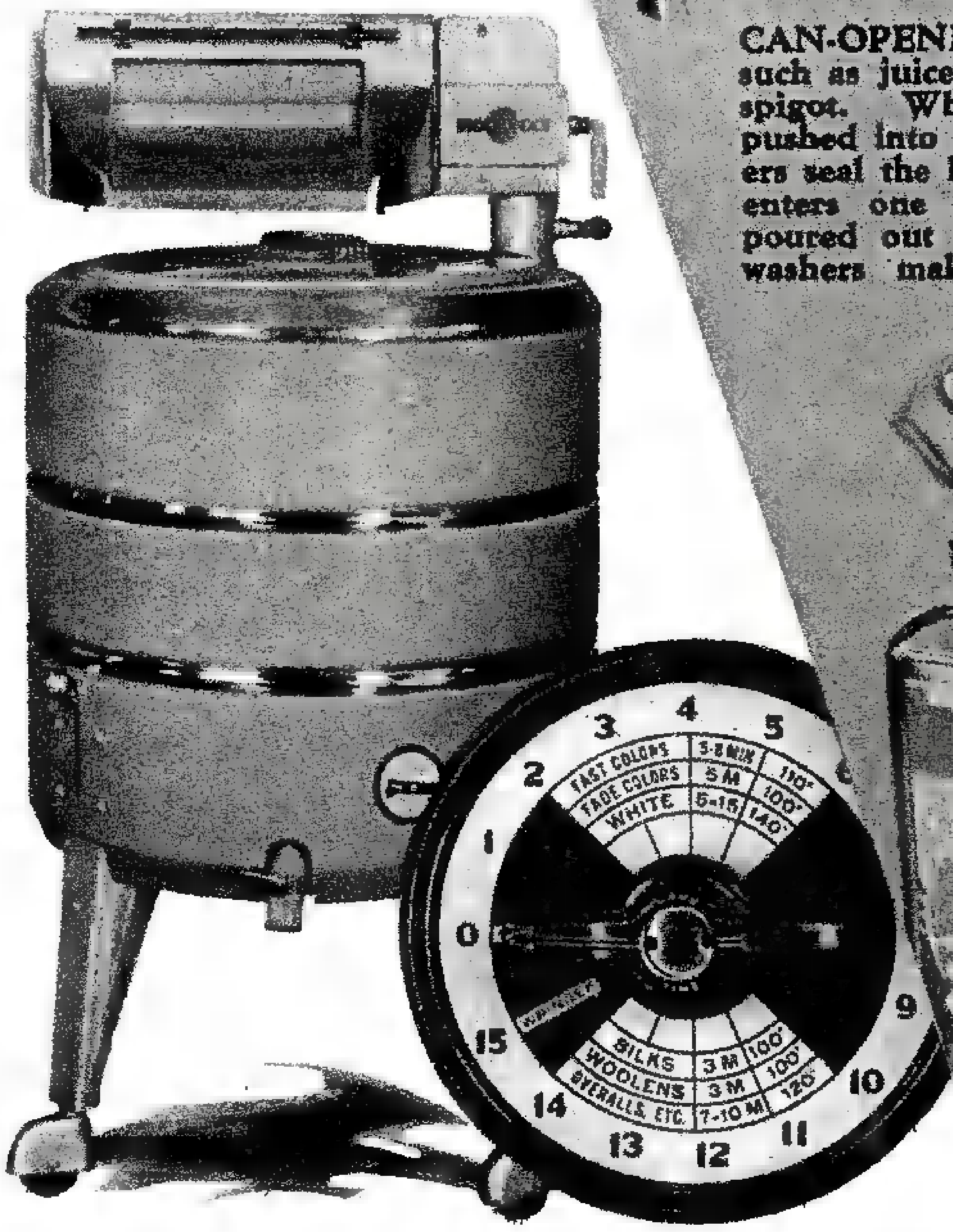
THIS WASHBOARD represents a whole laundry in itself. It is designed for small apartments, camping trailers and other locations where economy of space is desirable. The washboard contains soap rack, wringer and a self-supporting back rest. It can be used in a tub or in a small basin.



AIR CONDITIONED REFRIGERATOR keeps bread and cakes fresh for weeks at a temperature of 40 to 50 degrees. No frost forms in the compartment, and food such as bananas, cauliflower, and celery can be left uncovered.



CAN-OPENER FOR LIQUIDS such as juices and oils acts as a spigot. When the tubes are pushed into a can, rubber washers seal the holes. Then, as air enters one tube the liquid is poured out the other. Sealing washers make tubes air tight.


FAST COLORS 5-8 MIN 110°
FADE COLORS 5 M 100°
WHITE 6-15 140°
SILKS 3 M 100°
WOOLENS 3 M 100°
OVERALLS, ETC. 7-10 M 120°
0
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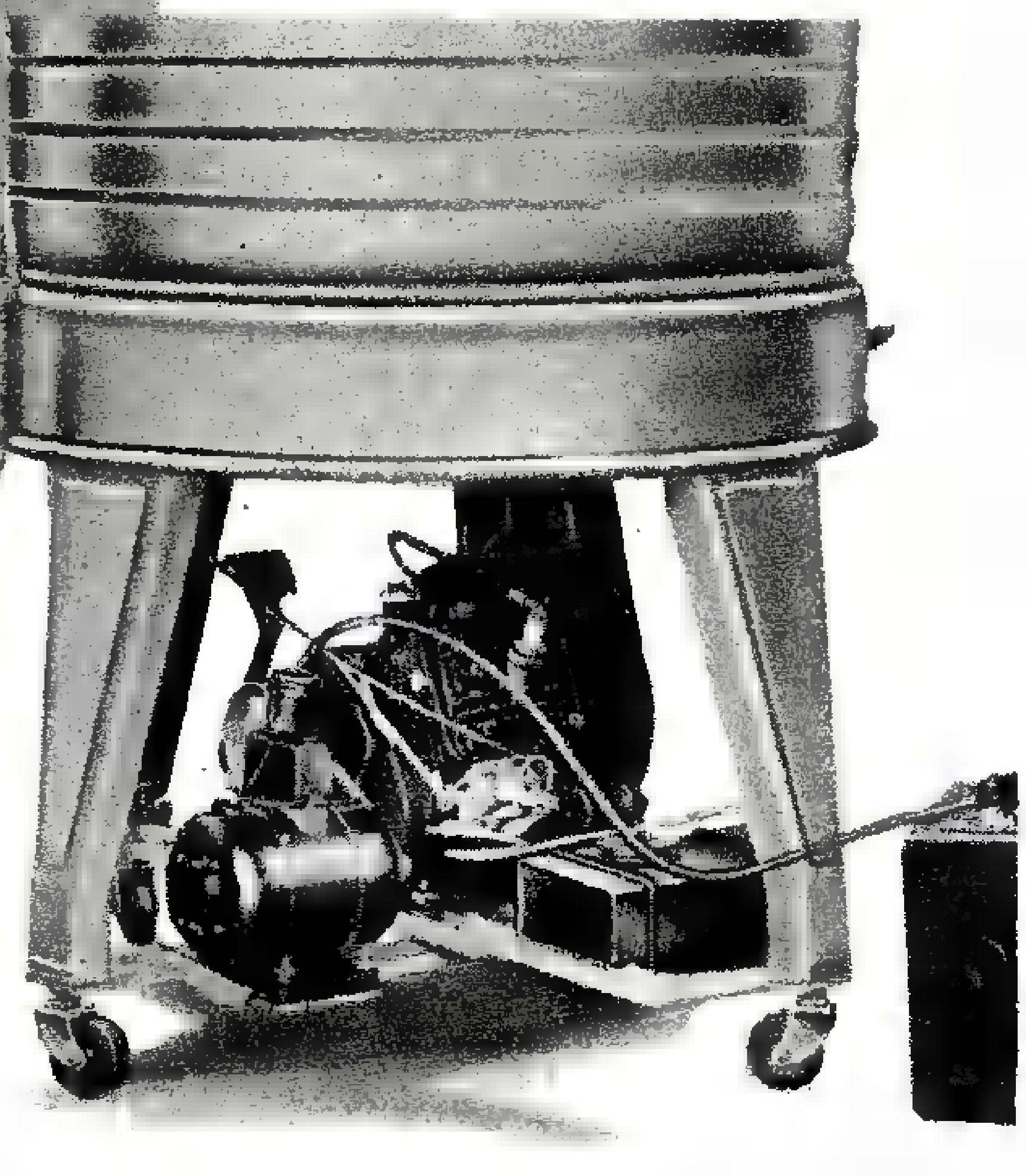
THIS TIME SWITCH modernizes old washing machines by making them automatic. Listed on the dial is the water temperature and washing time necessary for fabrics.



HERE IS A BATTERY CHARGING WASHING MACHINE. In rural homes where electricity is not available, this new washing machine charges the radio battery while doing the weekly laundry. The generator is mounted on the motor platform and uses a belt drive. It does not affect the motor power.

Texas Centennial Exposition Will Be Shown In Miniature

A bird's eye view of the Texas Centennial Exposition will be furnished by these models being built by Juan Larringa, shown finishing the food products and agricultural building. The poultry building is at left.

The wealth of detail included in the exposition models can be seen in the construction of this fountain. Right—Trees made of sponges grace the lawn of the model livestock building. Note the miniature reflecting pool.

VISITORS at the Texas Centennial Exposition to be held in Dallas this summer may see the entire world's fair at a glance as a result of the construction of a scale model replica of the buildings and grounds.

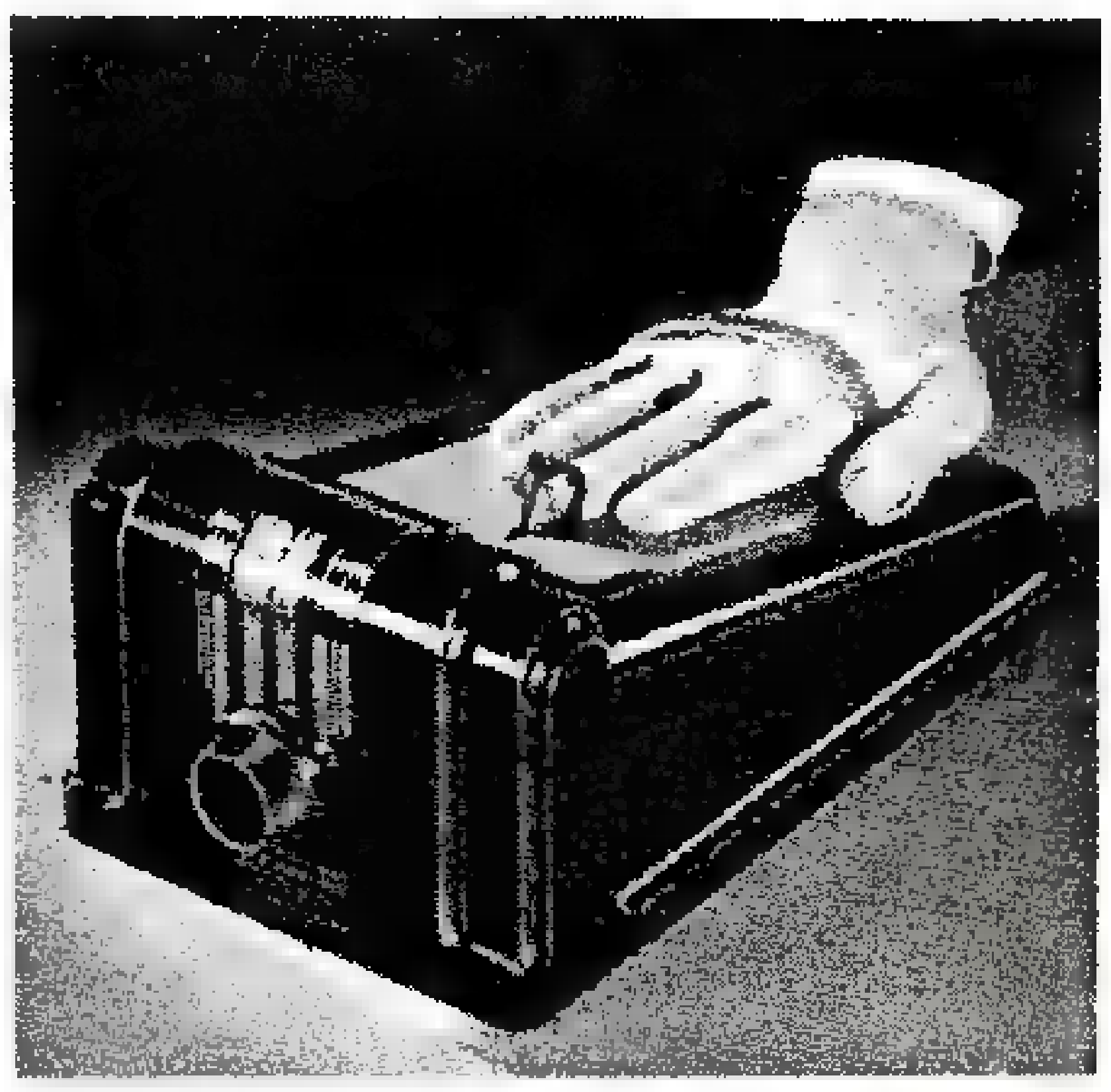
The miniature fair grounds, occupying 900 square feet, was built by Juan B. Larringa. For materials he used panel board, plastic wood, sponges, mirrors and paint.

His models include hanging gardens, illuminated basins, lagoons, fountains and realistic shrubbery. The Centennial group includes 16 permanent buildings, 16 semi-permanent exhibit halls, an amusement midway, race track, athletic bowl, auditorium and impressively huge entrances. Thousands of visitors from all parts of the world will view the exposition.

Device Fits Gloves Scientifically

TO FIT gloves scientifically a new device housed in a plastic case gives finger length and palm breadth in terms of glove sizes. A moveable button shows the length of the middle finger while a strap measures the palm.

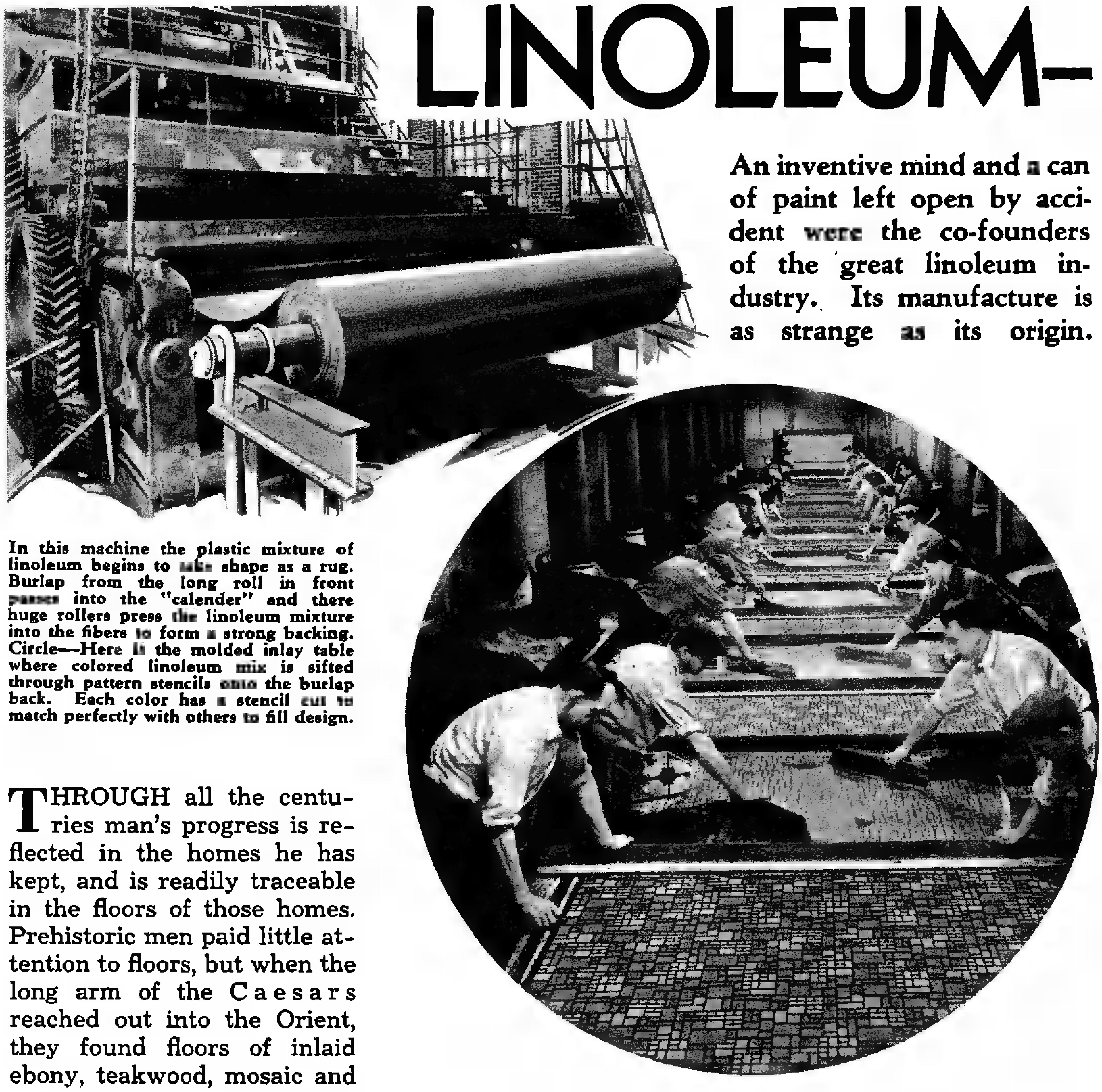
The readings are shown on dials.



This new machine measures the palm and finger length to fit gloves with scientific accuracy.

LINOLEUM—

An inventive mind and a can of paint left open by accident were the co-founders of the great linoleum industry. Its manufacture is as strange as its origin.



In this machine the plastic mixture of linoleum begins to take shape as a rug. Burlap from the long roll in front passes into the "calender" and there huge rollers press the linoleum mixture into the fibers to form a strong backing. Circle—Here is the molded inlay table where colored linoleum mix is sifted through pattern stencils onto the burlap back. Each color has a stencil cut to match perfectly with others to fill design.

THROUGH all the centuries man's progress is reflected in the homes he has kept, and is readily traceable in the floors of those homes. Prehistoric men paid little attention to floors, but when the long arm of the Caesars reached out into the Orient, they found floors of inlaid ebony, teakwood, mosaic and pearl, but only in the homes of the rich.

In 1863, Fredrick Walton, a youthful inventor of Yorkshire, England, made a great discovery in an open paint pot, over the contents of which the usual scum had formed. Turning his inventive genius to the matter of a use for this tough scum, he developed the idea for a new material which brought fine floors within reach of the average family for the first time.

By mixing a small quantity of gum with the oxidized linseed oil, which he had discovered in the paint pot, Walton found that he had a very satisfactory binder for ground cork and color pigments when pressed onto a backing of burlap. So began the great industry that today extends into every country. He called his invention "linoleum"—from *linum,* the Latin for flax, and *oleum,* oil.

The manufacture of true linoleum involves several major operations, developed first by Walton and used by linoleum manufacturers with but slight modification to this day. The steps are as follows:

First, the cleaning and grinding of the cork and the selection of the burlap.

Second, the making of "linoleum cement" from linseed oil.

Third, combination of the cement with cork powder, wood flour, minerals and color pigments to make "linoleum material."

Fourth, the application by heat and pressure of the linoleum material to the burlap base.

Fifth, the seasoning or hardening of the finished linoleums in great ovens in which the linoleum is baked for months on end.

Another Industrial *"Accident"*

The Mediterranean countries of Portugal, Spain and Algeria contribute cork.

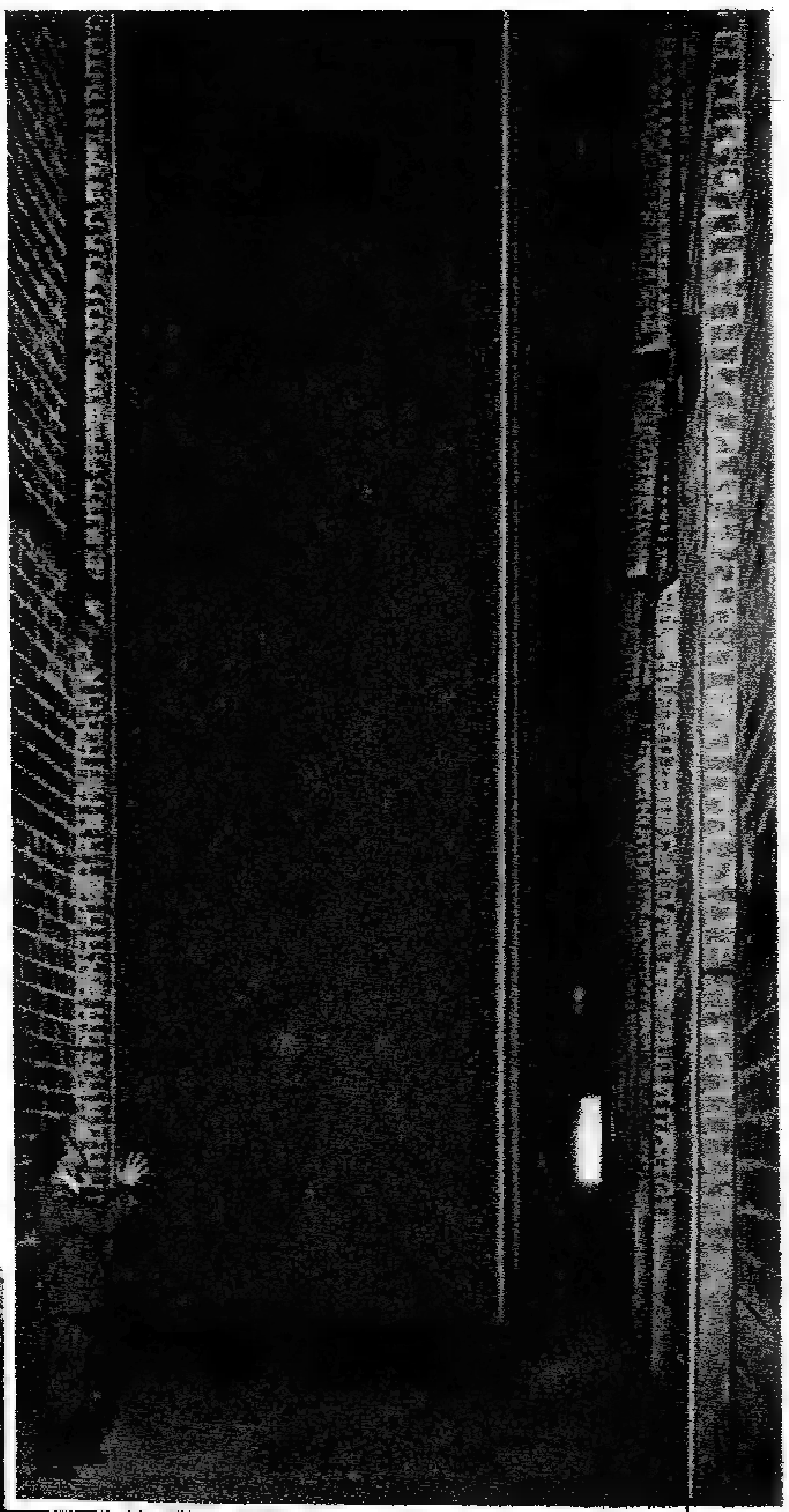
Cork has certain qualities possessed by no other materials, notably its lightness combined with strength, its elasticity, its imperviousness to air and water, and its insulation qualities. The cork is run through huge grinders, and then between enormous stones where it is ground so fine that it resembles talcum powder.

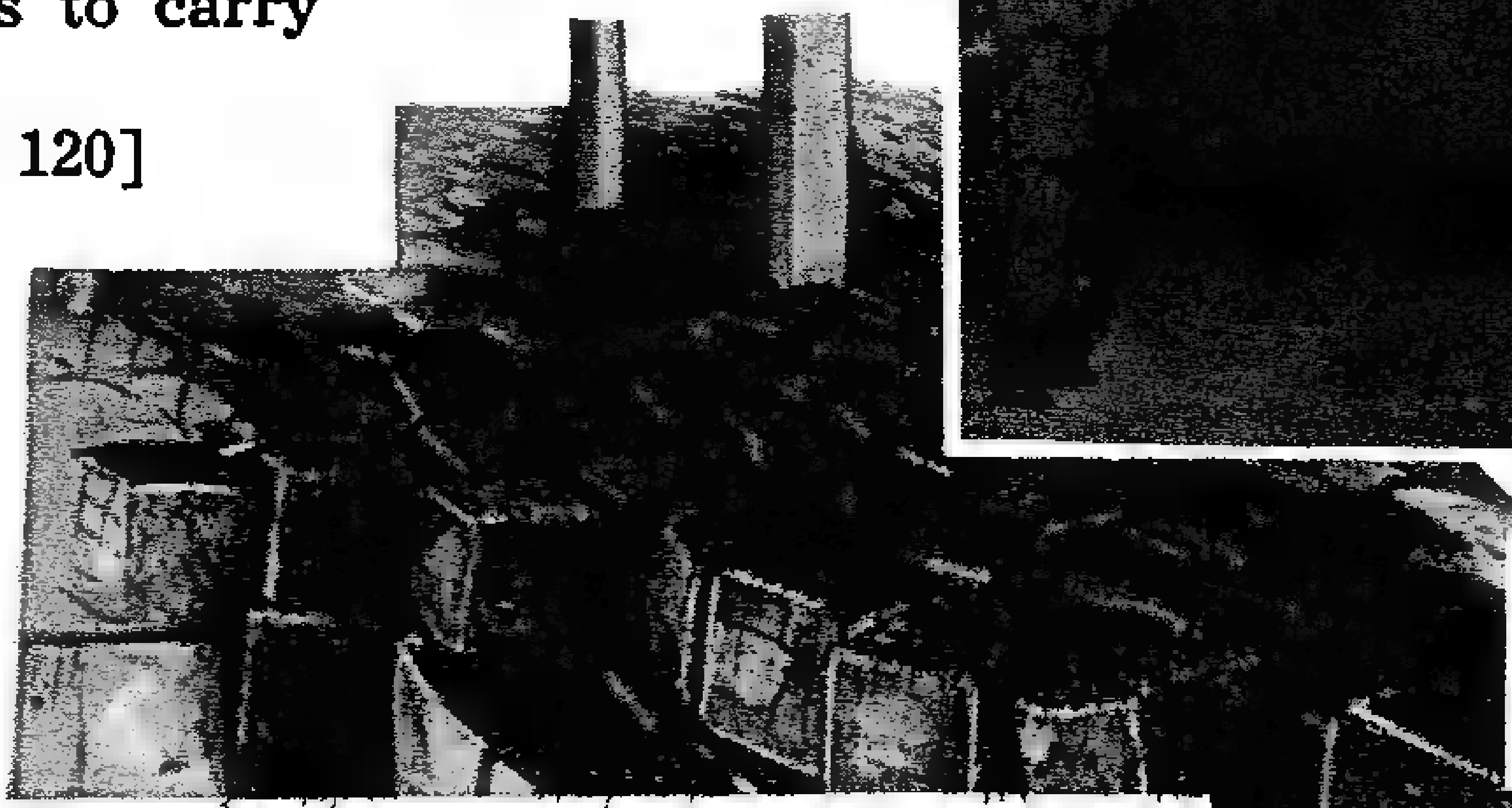
India grows jute, a reed whose strong fibres are woven into burlap. Only the Scottish weavers at Dundee weave burlap of the fine and even texture suitable for use as a backing for linoleum. Every yard is closely inspected so as to make sure that the burlap is free from knots and heavy fibres and of balanced strength between its width and length.

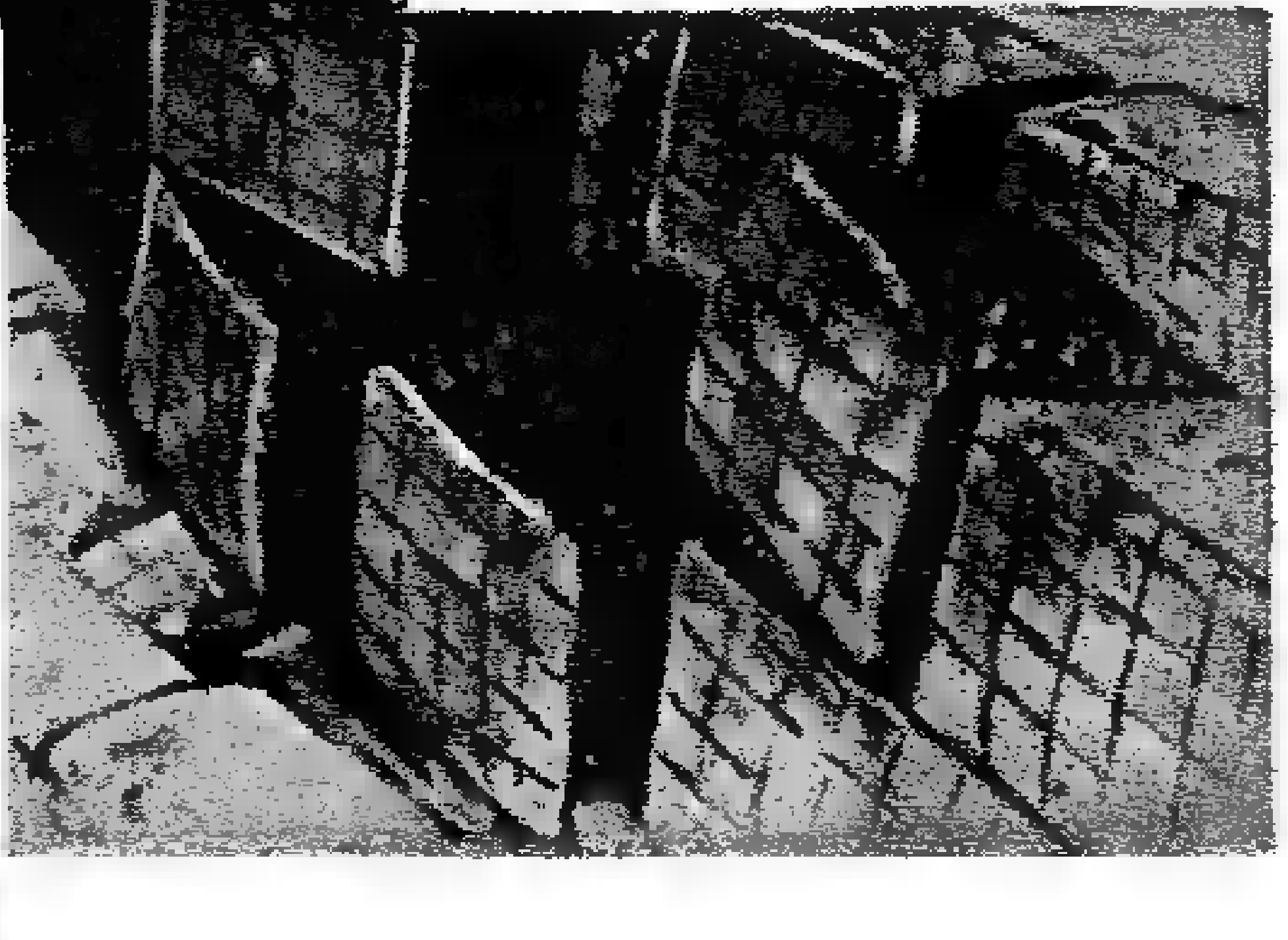
Linoleum "cement" is made from linseed oil and certain resins, which properly combined and treated, form a tough, rubber like material of great strength and endurance.

Mineral color pigments, obtained from various parts of the United States, are also an important factor, since bright and colorful patterns have come to be much in demand. Finely ground wood flour helps to carry these brilliant hues.

[*Continued on page* 120]

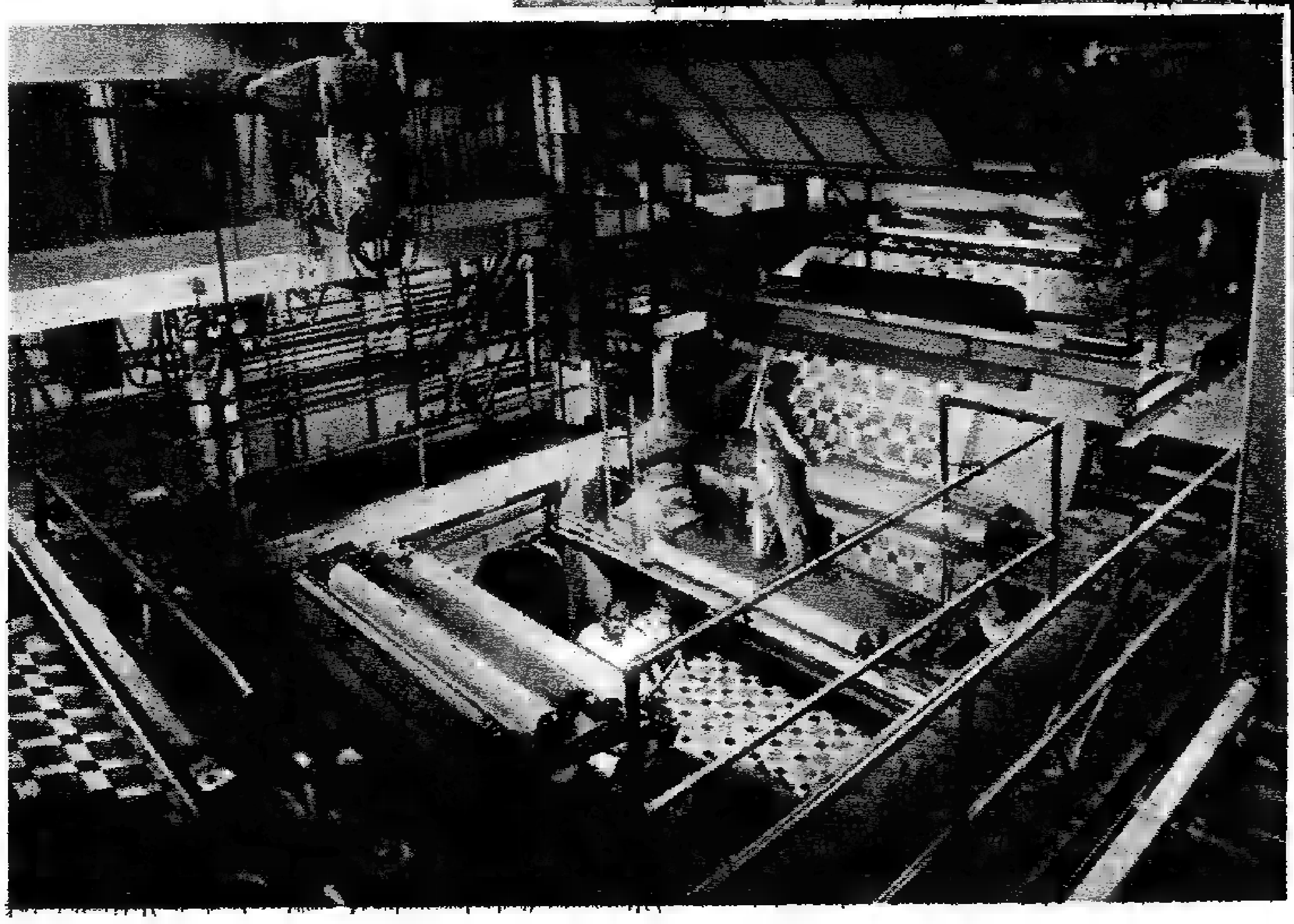






Cork, because it is tough, spongy, resistant to oil and water, and of great insulation value, is used extensively in making linoleum. It is ground into a powder as fine as flour.

More than a mile of linoleum is baked at one time in this oven. Baking lasts from three to six weeks while linoleum cures.

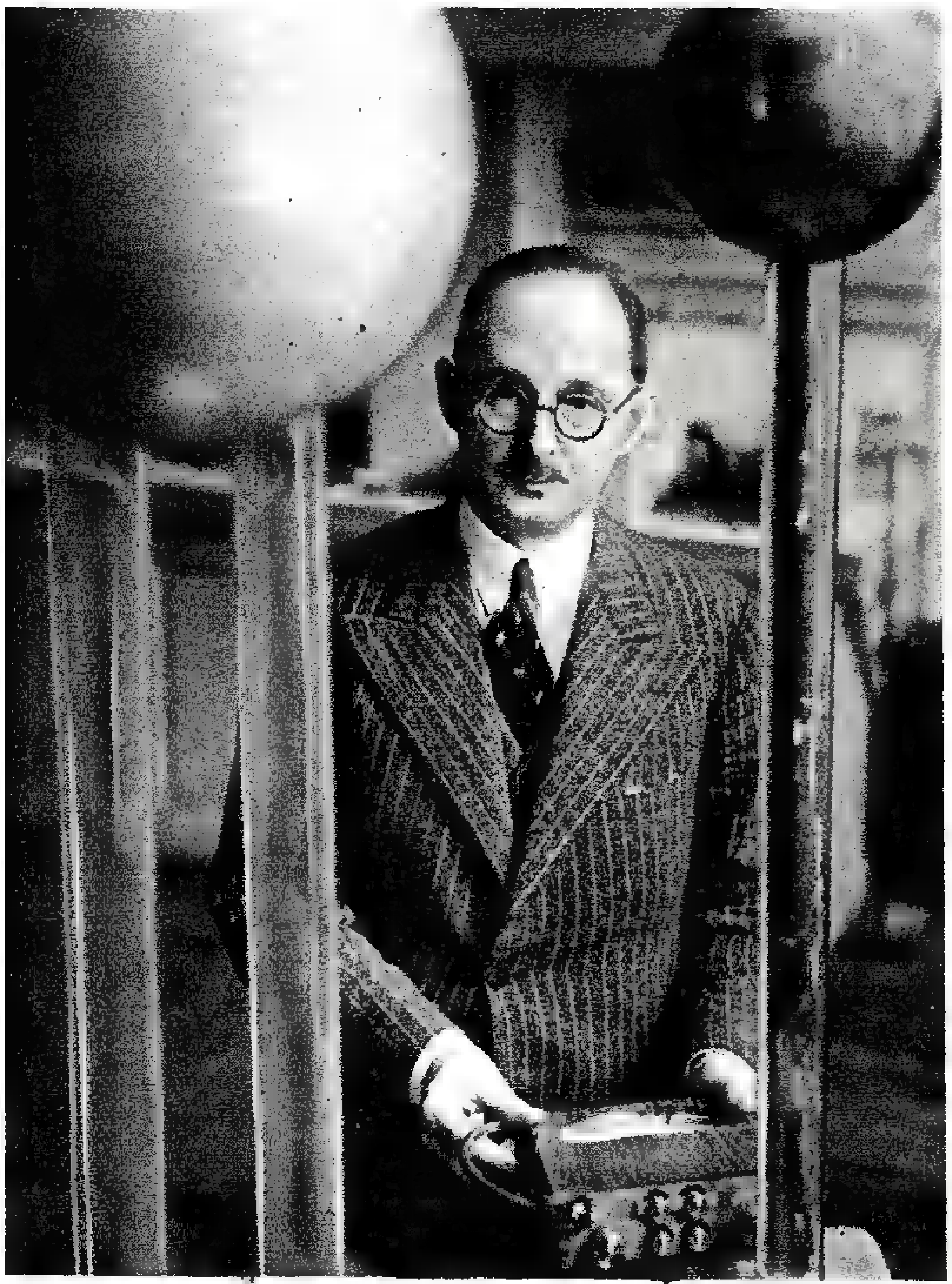


In this rotary inlay machine, linoleum "blankets" in solid colors are die-cut into small blocks, which are automatically shuffled into intricate designs. The pattern, fitted together like jigsaw blocks, is then drawn between presses where heat welds the material into a solid sheet. This process is easily distinguished from stencilling by its clean-cut lines.

Dust Powder Ionized In Tube Builds Up 450,000 Volts

STREAMS of dust, finer than flour, have made possible the construction of a high potential generator which can create a tension of 450,000 volts. Prof. Pauthenier of the Faculty des Sciences de Paris is the inventor of the new process.

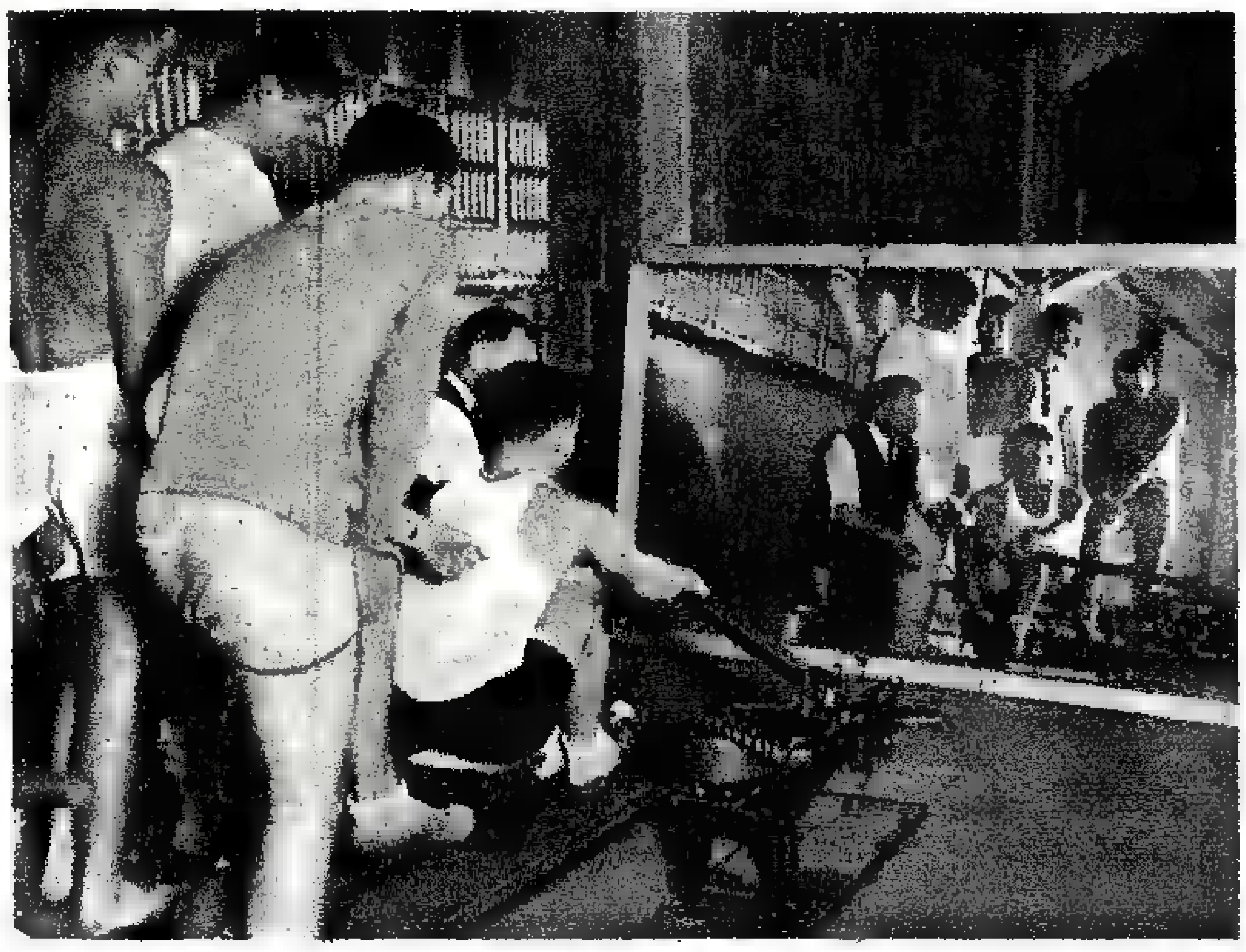
To produce the enormous voltage, dust powder is injected into a tube, the axis of which consists of a metal thread carrying a tension of 10,000 volts. As the dust becomes ionized upon contact with the wire, it is drawn into sphere approximately 2 feet in diameter. Here, by the process of accumulation, the tension is built up to 450,000 volts.



Into these spheres Prof. Pauthenier has crowded nearly a half-million volts. Dust particles ionized in a tube accumulate in the spheres to build up the 450,000 volt tension.

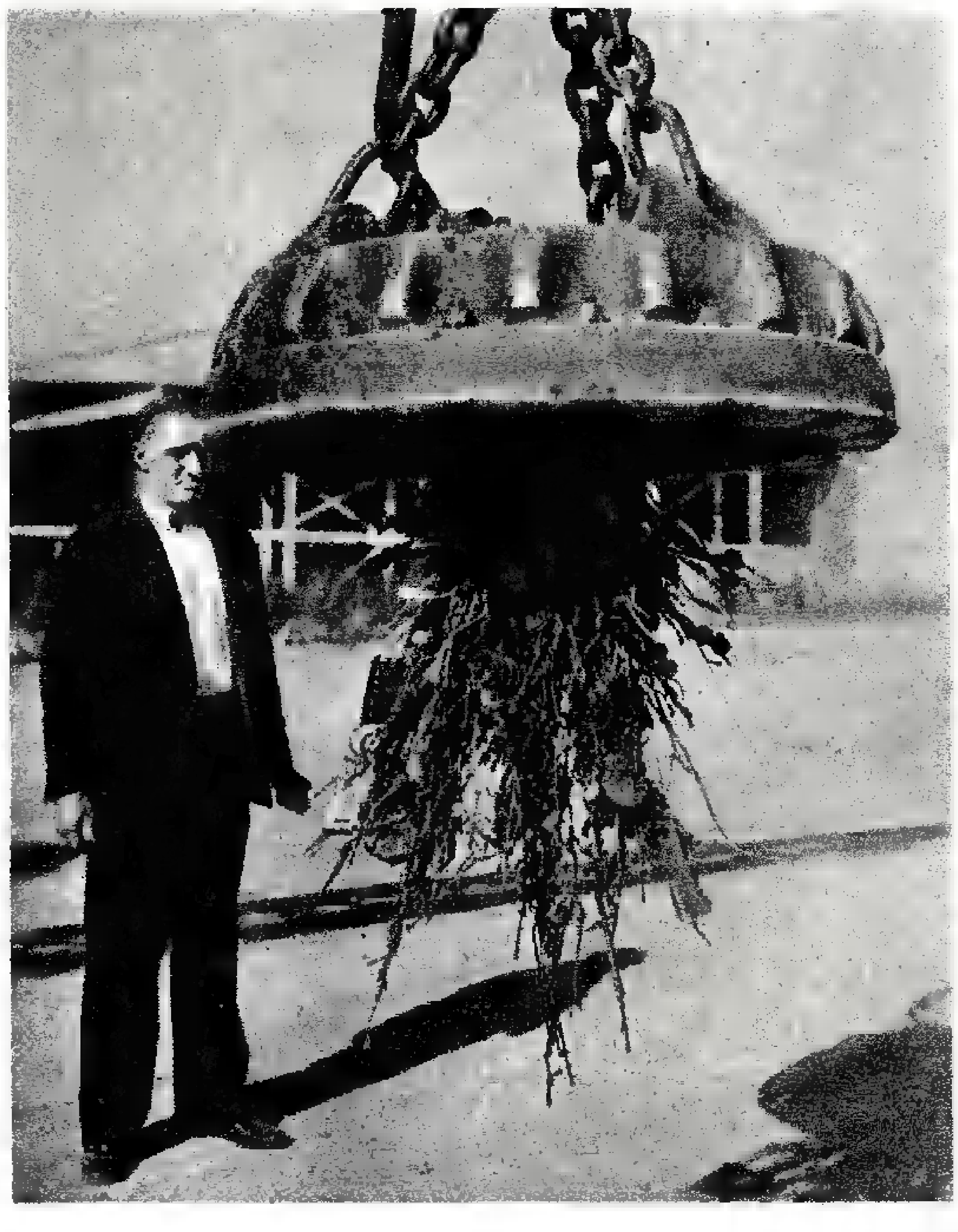
Mirror Checks Faults Of Oarsmen

THE perfect muscular coordination required in varsity rowing has been greatly expedited by the use of mirrors, Coach Rusty C. Callow of the University of Pennsylvania has discovered. The team members are seated on a rowing machine placed before a large mirror, and as they go through their strokes, their faults are pointed out in the glass. Once they actually see their mistakes, they lose no time in correcting them.



Varsity crew members see themselves as others see them, and in this way correct themselves in half the time, Coach Rusty Callow believes. He is shown correcting a team candidate.

Road Magnets Cut Flat Tire Toll



Here are potential "flat tires" by the bushel, picked up by this electric magnet after a football game at the Rose Bowl. Each pound of metal represents 63 possible tire hazards.

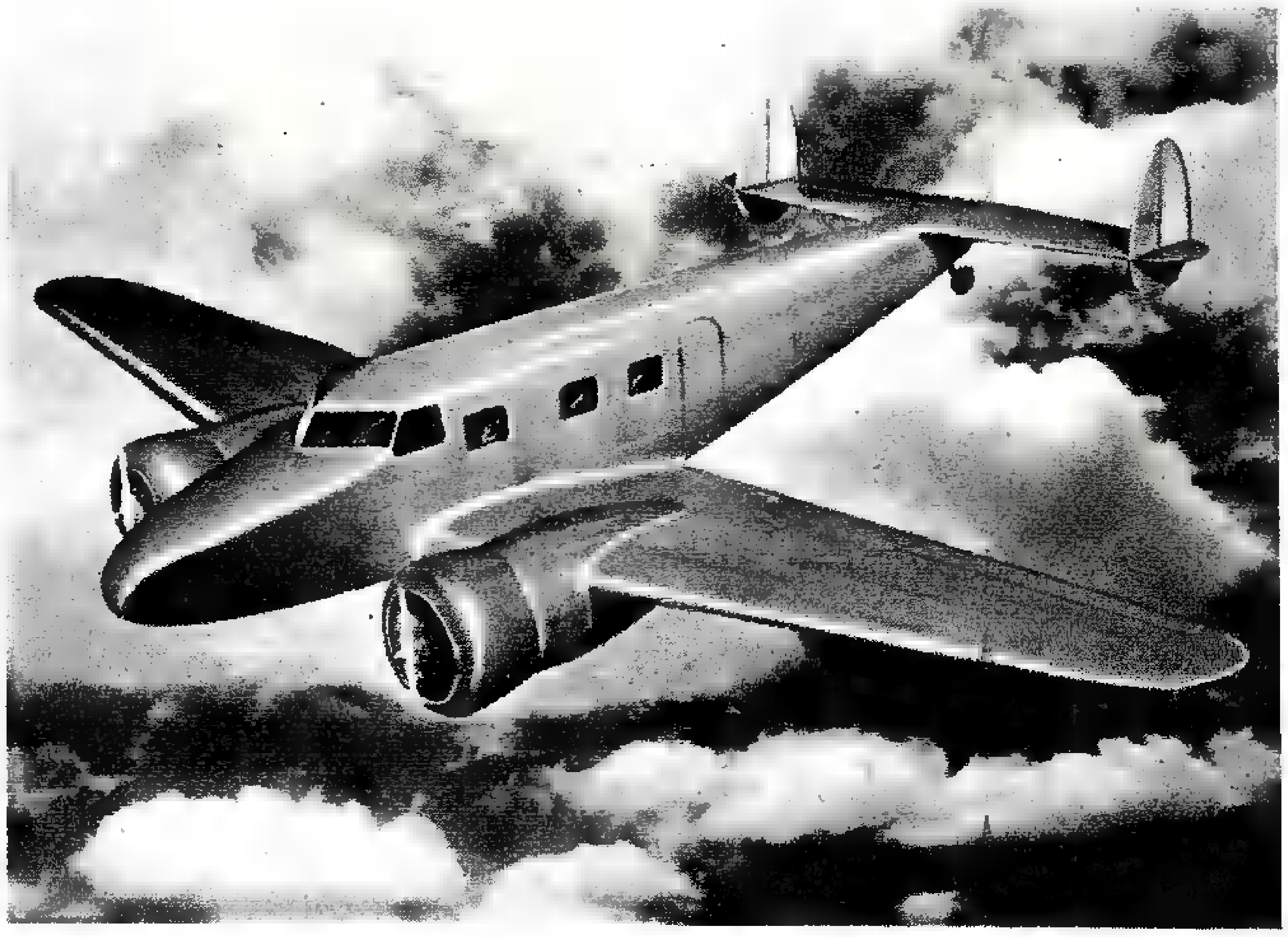
THE war on flat tires being waged by powerful electric magnets mounted on trucks has been entirely successful, reports from all parts of the country indicate. South Dakota, during the past year, collected 52,395 pounds of metal from its roads, enough to cause 3,300,000 flats. At the Pasadena Rose Bowl more than a ton was collected after a football game.

Small Airliner Is Fastest In Service

RECOGNIZING the need of a fast economical airliner to serve private industries, small airlines, and feeder lines of the major airlines, the Lockheed Aircraft Corporation of Burbank, Cal., has designed an 8-place, twin engine craft with a maximum speed of 231 miles per hour.

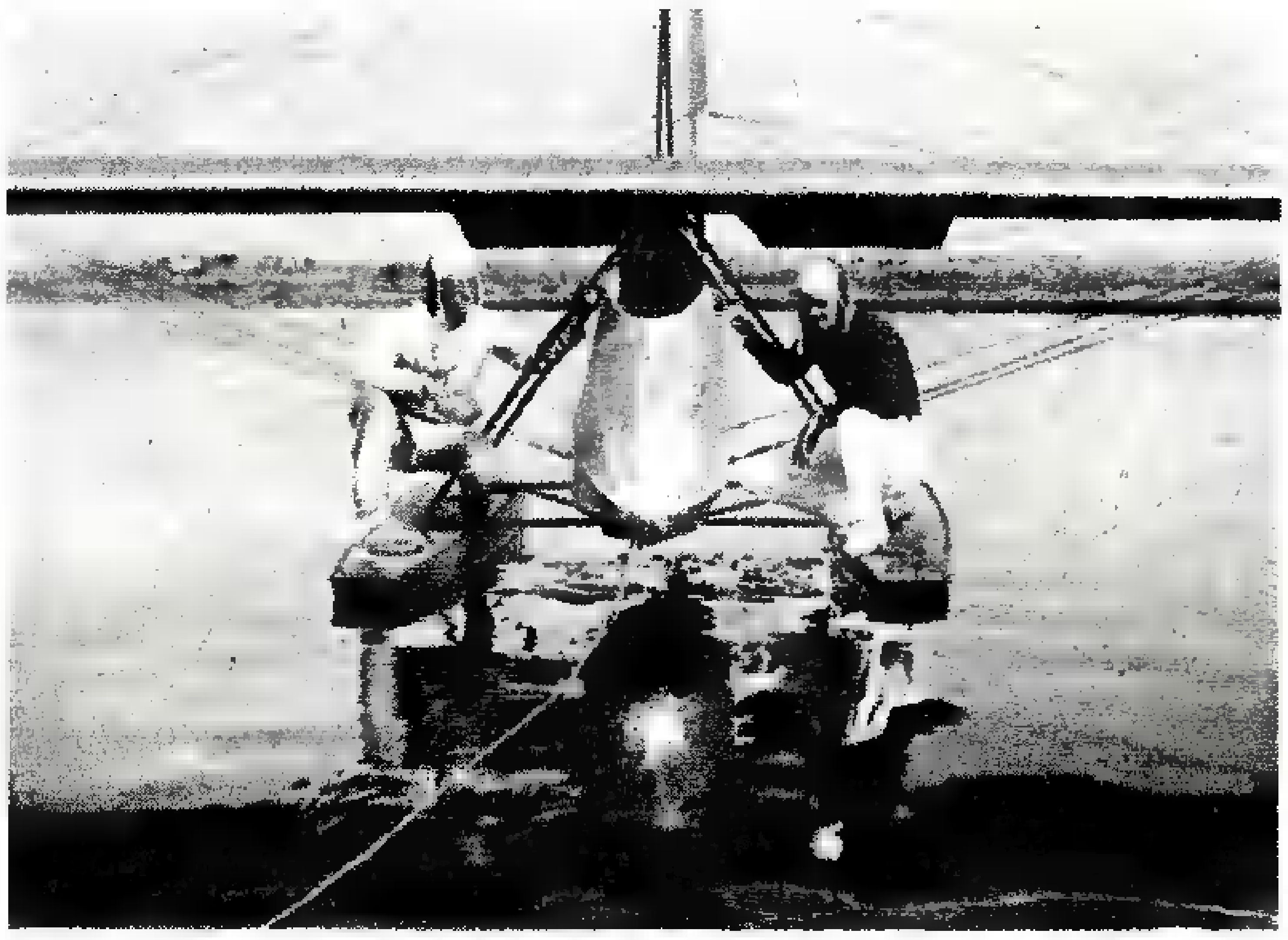
The new plane is constructed of aluminum alloy with skin-stressed wings of advanced design. The wing spread is 49 feet, six inches and the overall length is 36 feet, 4 inches, of which 14 feet, 8 inches is cabin.

The cabin is sound proofed throughout and equipped with special ventilators. In the rear compartment and in the nose 450 pounds of cargo can be stored. At sea level the plane will take off in 600 feet and climb 1400 feet per minute.



This is the new Lockheed 12 designed for small airlines, private industries, and as a feeder plane for the major airlines. It carries 6 passengers, 2 pilots, and a 450 pound cargo at speeds up to 231 miles per hour.

Pontoon-Glider Stunted By Youth



Franklin Woolcott, left, and Don Stevens inspect their stunting pontoon-equipped glider. It is launched by towing it with a fast boat or airplane. It can be looped and rolled.

FLYING stunts such as most pilots believed could be accomplished only in a power plane have been performed in a pontoon equipped glider by Don Stevens, 21-year-old flier of Glendale, Cal.

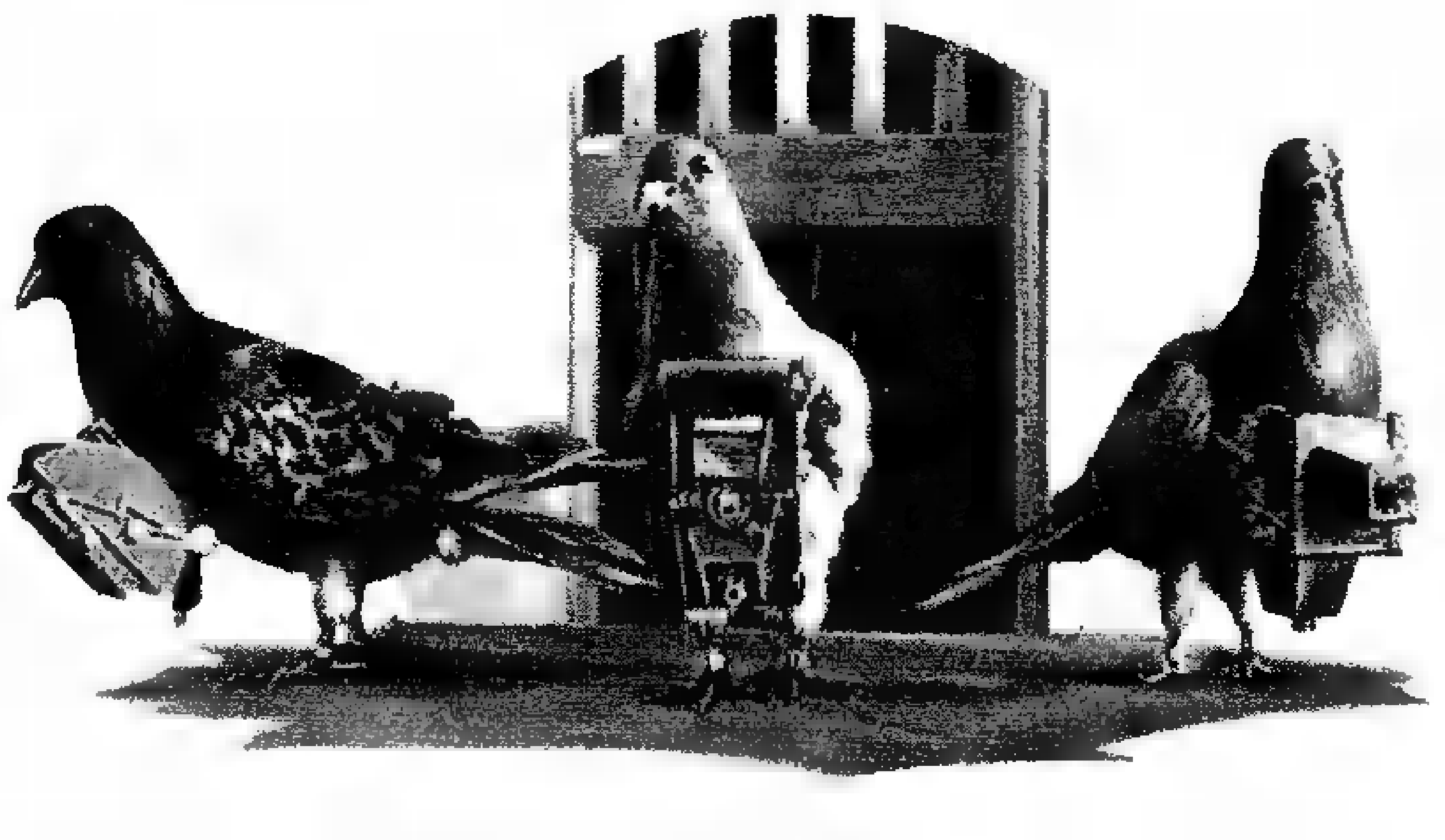
Soaring over the bay, Stevens swooped down over a speeding motorboat to pick up his partner, Franklin Woolcott, as just one of his many daring sunts, which include loops, rolls, and vertical dives. Stevens has performed for the newsreels and one full length movie feature.

Carrier Pigeons Turn Cameramen

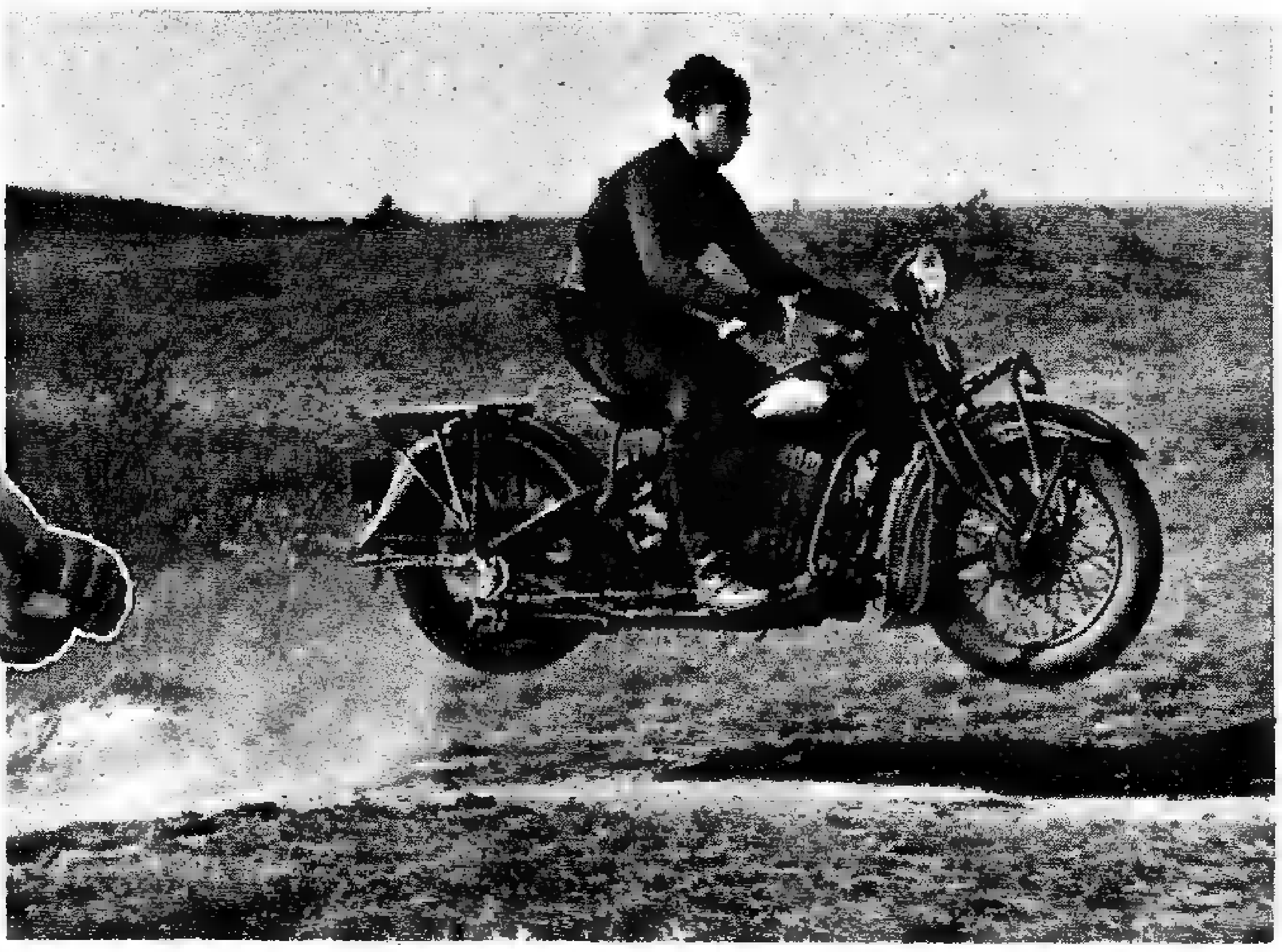
SOMETHING entirely new in aerial photography has been developed in Munich, Germany. In place of trained photographers carried aloft in airplanes or observation balloons, camera equipped pigeons are released to fly over the object to be photographed.

The pigeons do not fly at random. Months of training and selection are required before a few birds are chosen for camera work. Then their flights in each direction are timed so that the trainer knows exactly at what time the bird will be over a certain point. It is then a simple matter to time the camera to expose the film at the point desired. The cameras do not impede the flight of the birds.

So valuable are these expertly trained pigeons that breeding stock often brings more than $2,000 per head.



These aerial photographers fly over a certain course every day and their flights are timed. Thus the trainer can adjust the camera timers to snap any desired picture on the course.



Breath-taking leaps of 50 feet and more are made on one of the prepared jumps of the T. T. track. This rider takes a stock machine over a hurdle for a 25-foot jump. Small tracks provide numerous big thrills.

Having stripped his machine of everything save the bare essentials, this rider prepares for the start of a Tourist Trophy race. Motors are started after flag has been dropped.

Packing Thrills

by WALTER E. BURTON

ONE of America's newest and most exciting sports is misnamed: there should be an "N" between the initials of T. T. racing, for there are few forms of excitement that contain more high-explosive qualities than this motorcycle pastime.

A T. T. race is an American, and usually a miniature, version of the famous Tourist Trophy races held yearly on the Isle of Man. It is a motorcycle contest packed with thrills, spills, dust, speed, breath-taking moments and a lot of fun for everyone concerned. It looks like an elaborate and noisy way of committing suicide; but surprisingly few bones have been broken in such competitions. In fact, women riders frequently tackle the milder parts of a T. T. course.

Let's accompany the Ohio Ramblers on a Sunday afternoon visit to their T. T. track, which is scarcely a year old. The Ohio Ramblers is a motorcycle club, made up of riders who live in and near the city of Massillon.

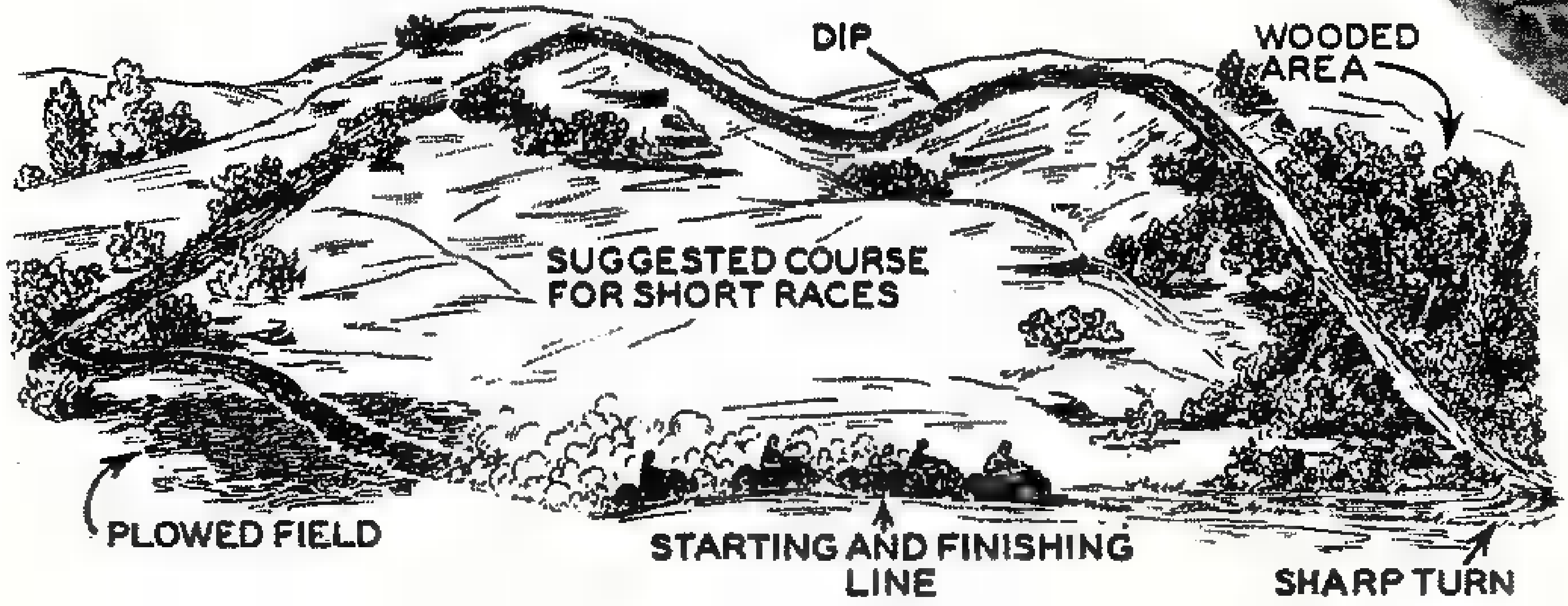
The Ramblers' track is, so the club members claim, one of the most perfect in the state, if not in the country. It is the result of a long and careful search for just the right kind of land. An outstanding feature is that spectators can stand on top of any one of several neighboring hills and view the entire course. There are no large trees in the area, only a few shrubs—mostly bushes bearing long, sharp thorns which riders have learned to respect.

This being merely an informal practice run, the machines are standard in design and equipment. For actual racing, special stripped motorcycles generally are used. All of the riders wear leather crash helmets as a matter of protection.

The starter drops the white flag. The motors, which had been dead, leap into action, and in a flash the sextet is roaring around the first turn. This is a very mild turn, being only a right-angle one, partly banked. Hardly have the machines straightened out when the leading one strikes the first of a series of hairpin curves. Some of these curves are tilted at dizzy angles on the side of a hill. Now the skidding cycles have negotiated them safely, executing in the process a few dizzy and dust-raising fish tails, and are headed down a short but steep bank preparatory to making a sharp right-hand turn and climbing to the top

Here is another view of a motorcycle stripped down for some fast work on the T. T. track. Right, above—Taking the turns on a well planned course. As the riders plunge over the steep embankment, they are confronted with a sharp turn to the left and another steep hill. Such riding requires skill.

in a Motorcycle T. T. Track



Above—Loose rocks and gravel are purposely left on the track to further test of the skill of the rough-riders. Left—This proposed course, patterned after the Massillon, Ohio, T. T. track, packs as many thrills in its half-mile length as most cross-country tracks. Notice the jump into the plowed field near end of course.

of the steepest and tallest hill on the course.

When the dust clears away, a rider is seen struggling to his feet. His machine is lying on its side a yard away.

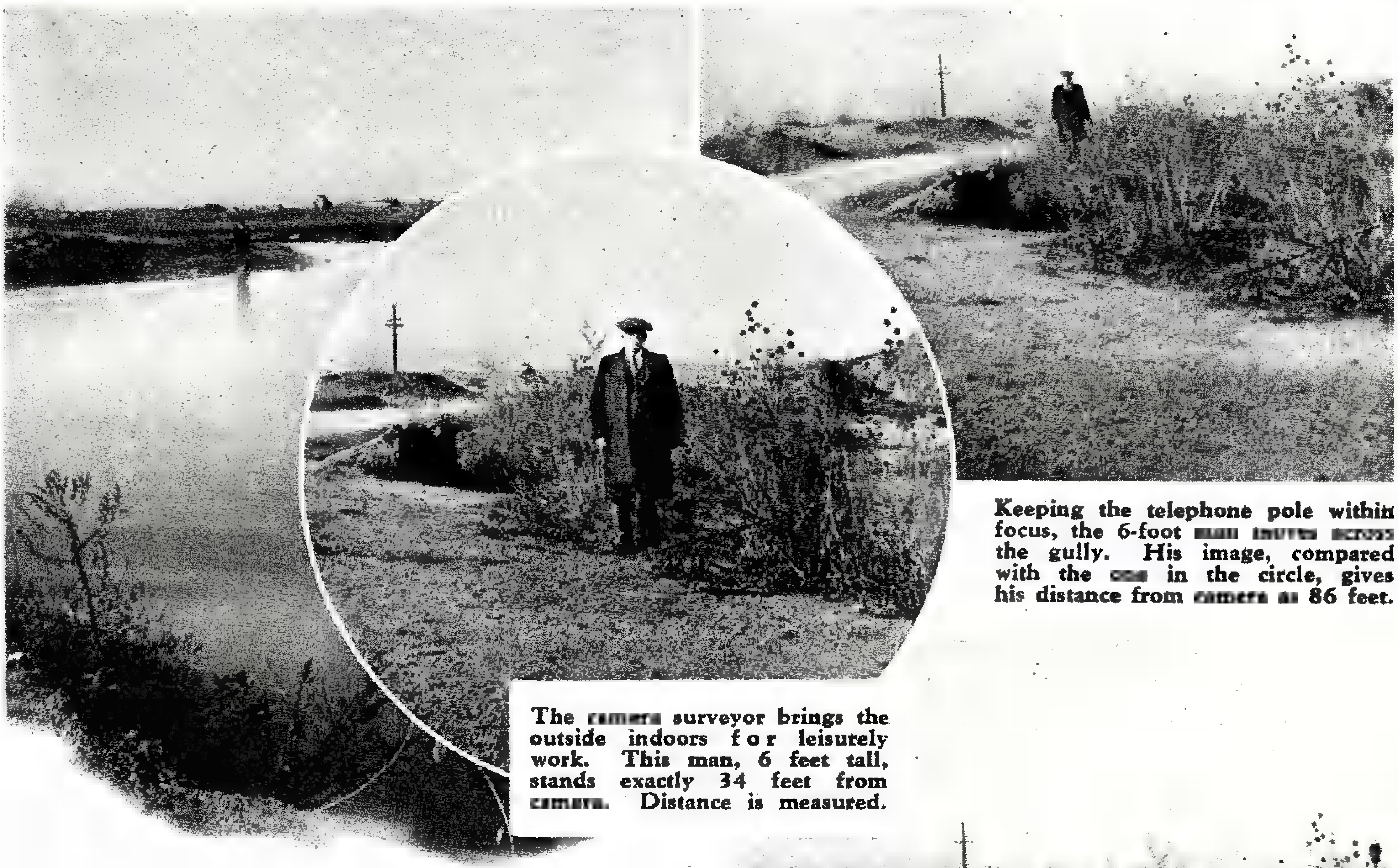
The five remaining machines, after engaging in a short but lively hill-climbing contest, have reached the high point of the course, and have idled down for the next test. This is a descent of a rocky, loose-dirt hillside that would make a mule pause and consider. But the motorcycle roughriders do not hesitate. Down the hill they slide, and skid around the sharp turn at the bottom, showering the surrounding bushes and a few venturesome spectators with dirt. There are two sprawling flops on this bottom turn, but the riders are up in an instant and on their way.

Then come a series of up-and-down waves scrambled with a few more hairpin turns, and the motorcycles are on the home stretch. There remains one more formidable obstacle. The track has been dug away to produce a sudden rise of perhaps two feet, over which a rider has to leap in order to complete the run. Because stock machines are being used the cyclist hop this miniature cliff with considerable caution, flying through the air perhaps only 10 or 15 feet. However, in actual competitions, when stripped machines are being used, riders sometimes make broad jumps of 60 feet, and clear the ground by 4 or 5 feet.

And that, in brief, is what a run over a T. T. course is like. For the most part, the machines travel in low gear, although on some

[*Continued on page* 126]

Camera Brings Surveyor's Field Indoors



Keeping the telephone pole within focus, the 6-foot man moves across the gully. His image, compared with the one in the circle, gives his distance from camera as 86 feet.

The camera surveyor brings the outside indoors for leisurely work. This man, 6 feet tall, stands exactly 34 feet from camera. Distance is measured.

From across the pond the gentleman appears as little more than a speck upon the film. Accurate measurement of his image, however, reveals that he is standing just 258 feet from the camera. Thus the distance across the pond is found.

USING his camera as a transit, a Denver mining engineer has discovered a new method of bringing the outdoors into his photo-laboratory for leisurely surveying. A magnifying glass, ruler, and an easy chair have been substituted for rod and chain.

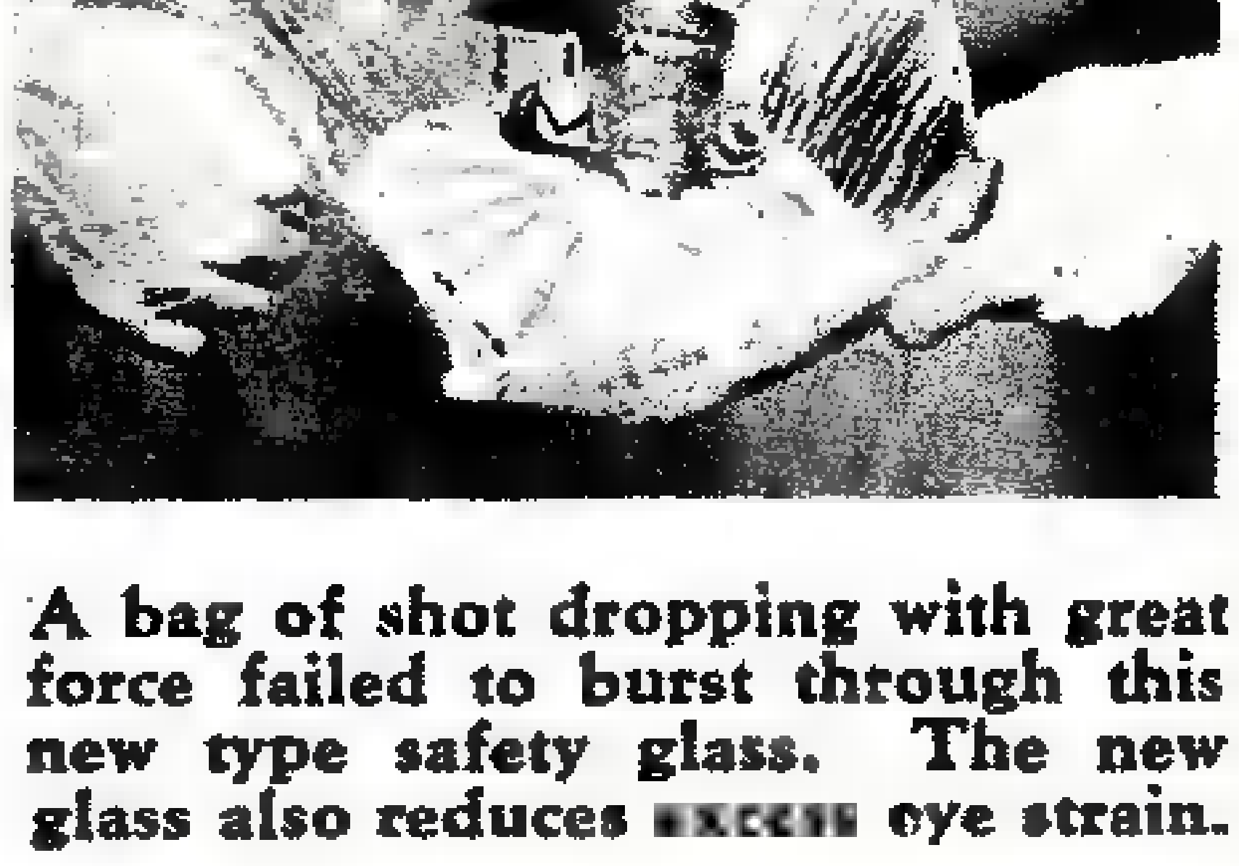
The first step in the process is to measure the height of some object in the foreground of the land to be surveyed. This object is then photographed at a measured distance from the camera such as at 50 or 100 feet. If the object is a six-foot man standing 100 feet from the camera, his image will show on the film approximately ¼-inch tall. In each film in which his image appears as ¼-inch tall, he will be 100 feet away. If his image is but ⅛-inch tall he is 200 feet away, and if but $\frac{1}{16}$-inch tall he is 400 feet away.

By drawing a center line on the print a little measuring will give the degrees to right or left, while a level line through the middle of the pictures will give the elevations. Thus a six-foot man photographed on a knoll enables the surveyor to determine the elevation of the knoll, its distance to right or left of any line, and its distance from the camera.

With the telephone pole still within focus, the gentleman climbs a distant knoll. The distance between his image and the centerline of the film gives the elevation of the knoll, and the size of his image, when compared to that in circle, gives distance to knoll as 207 feet. A box camera can be used.

New Safety Glass Bends On Impact

A NEW resilient safety glass yields like a safety net when struck, and does not scatter in loose pieces. A clear, rubber-like gum is used to bind the glass sheets together.



A bag of shot dropping with great force failed to burst through this new type safety glass. The new glass also reduces excess eye strain.

Radio Sparks

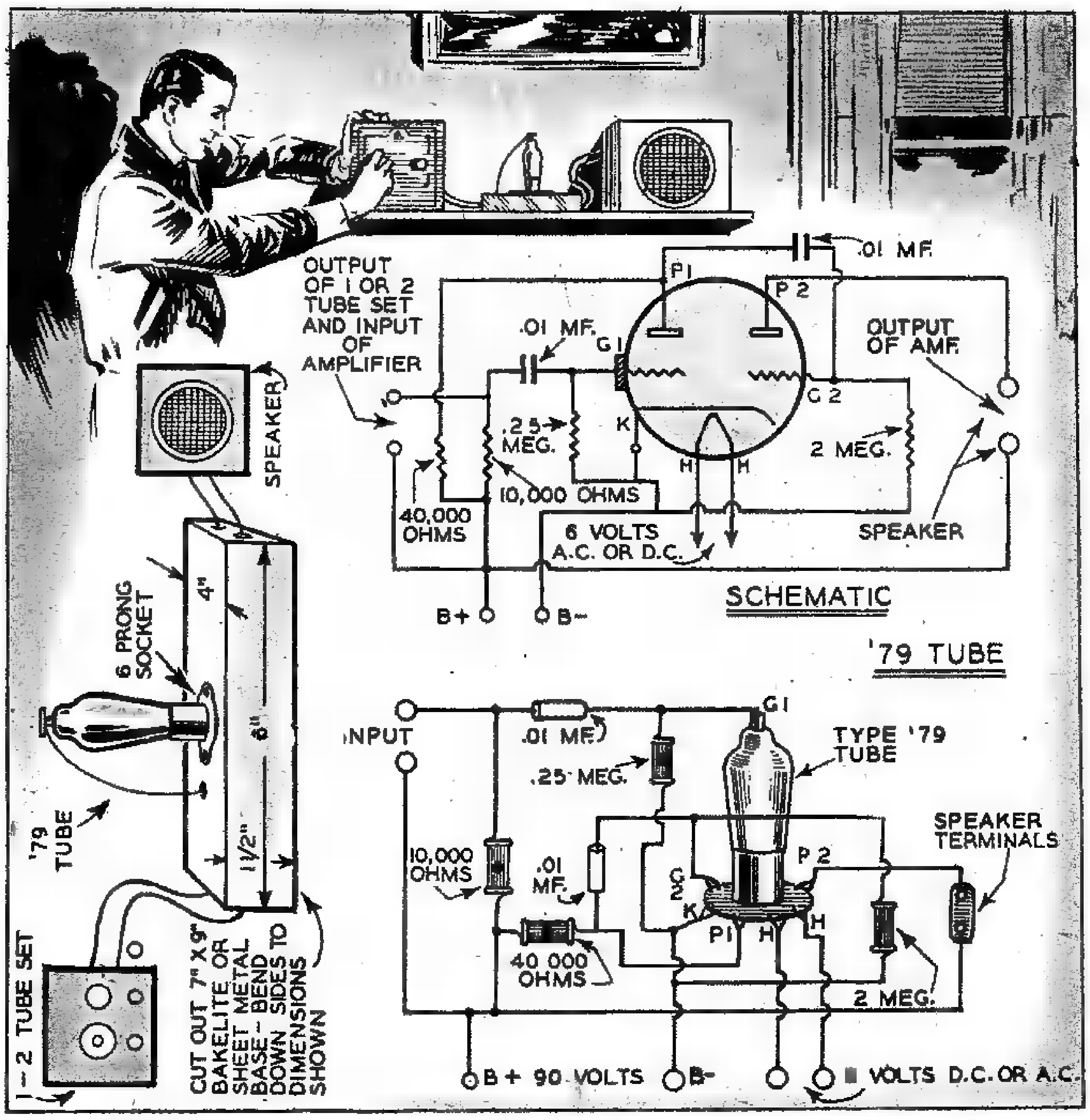
Boost Short Wave Set's Volume With "2-in-1" Amplifier

ARE you one of the many radio fans who has been seeking a simple amplifier for use with your homemade short wave receiver? If so, here is an amplifier that is not only simple, but practical and one that will deliver plenty of power. The secret of this device is in its tube—the '79 TWIN. Having two sets of like elements this tube is actually two tubes in one and when used in a resistance coupled amplifier circuit takes up very little space. The total cost should not exceed $2.00.

The chassis is constructed from sheet metal bent to form as shown. If desired a bakelite panel can be substituted instead, but the former is best. Drill holes in the ends of the chassis for the input and output (speaker) terminals, tube socket and cable. Mount the terminal strips and socket with small machine screws and wire up the various resistors and condensers. These should be of the pigtail type so as to eliminate all unnecessary wiring. The resistors need not be very heavy, ½-watt sizes will be plenty large. The condensers should have a 200-volt rating.

By following out the pictorial parts layout even the most experienced should have no trouble in getting the amplifier to work. If desired the builder can purchase a small metal cash box in the 10-cent store and use this for a chassis. It is not necessary to adhere to the dimensions given here as these are merely for suggestion. The amplifier is operated on 90-volts of B current and 6-volts for heating the tube's filament.

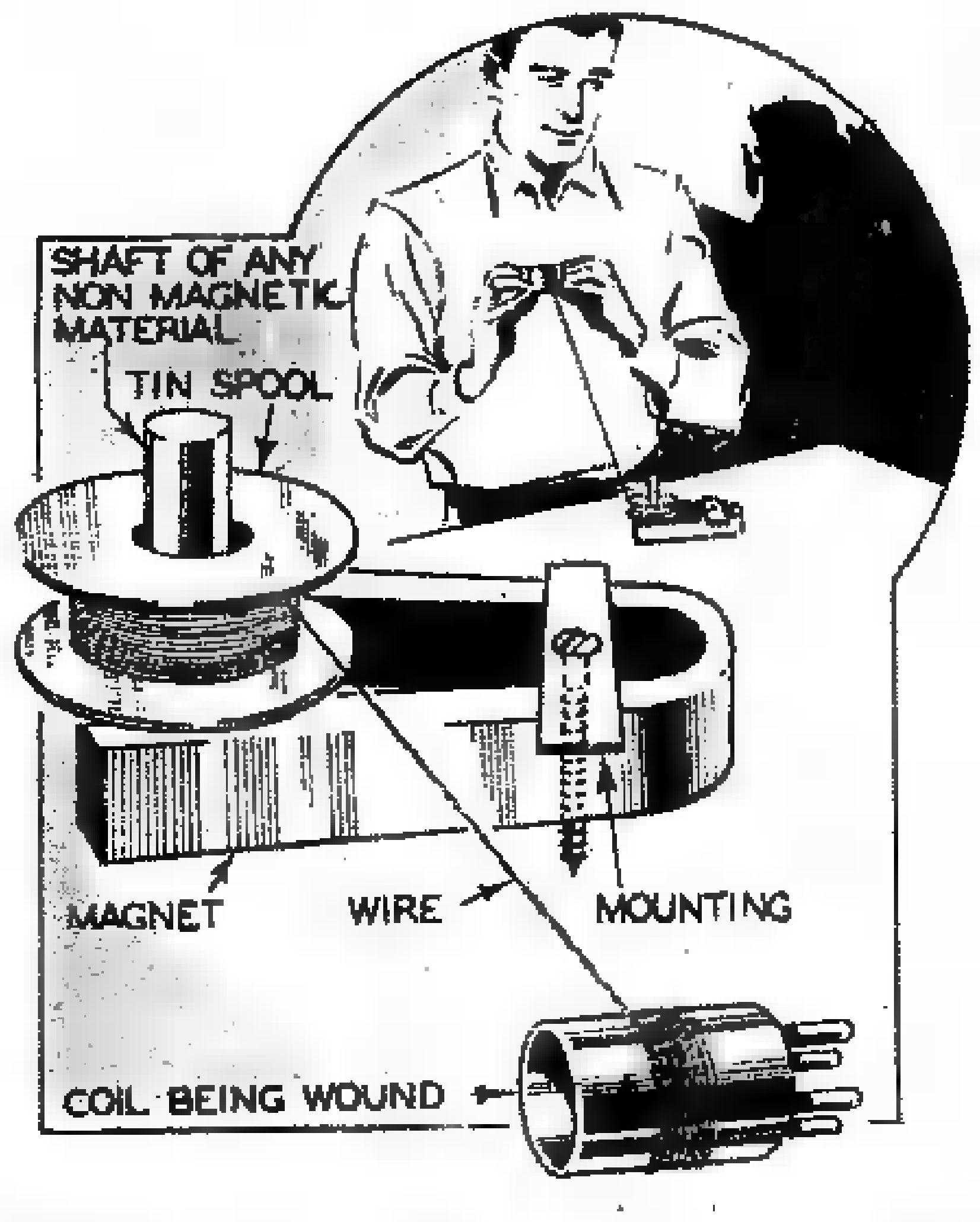
Current for operating the amplifier may be taken from the same source that supplies the power to radio set. If desired the B current may be increased to 135 volts although it will function very well on less.


OUTPUT OF 1 OR 2 TUBE SET AND INPUT OF AMPLIFIER
.01 MF.
.01 MF.
P1
P2
G1
G2
K
H
H
.25 MEG.
10,000 OHMS
40,000 OHMS
2 MEG.
OUTPUT OF AMF.
SPEAKER
6 VOLTS A.C. OR D.C.
B+
B-
SCHEMATIC
'79 TUBE
SPEAKER
6 PRONG SOCKET
4"
8"
1 1/2"
'79 TUBE
1-2 TUBE SET
CUT OUT 7" X 9" BAKELITE OR SHEET METAL BASE-BEND DOWN SIDES TO DIMENSIONS SHOWN
INPUT
.01 MF.
.25 MEG.
TYPE '79 TUBE
10,000 OHMS
.01 MF.
40,000 OHMS
SPEAKER TERMINALS
2 MEG.
B+ 90 VOLTS
B-
VOLTS D.C. OR A.C.

In wiring up the amplifier care should be taken so as to make the connections to the tube correct, otherwise the amplifier will not function. Refer to any radio tube chart for the socket connections if not familiar to you.

Magnet Aids In Coil Winding

SHORT wave coil winding can be greatly simplified by using this novel arrangement. Wind the coil wire on a tin spool and slip over a wooden shaft mounted between the poles of a magneto magnet. Magnet provides perfect tension.


SHAFT OF ANY NON MAGNETIC MATERIAL
TIN SPOOL
MAGNET
WIRE
MOUNTING
COIL BEING WOUND

This simple magnet arrangement permits the radio fan to wind his own short wave coils very easily.

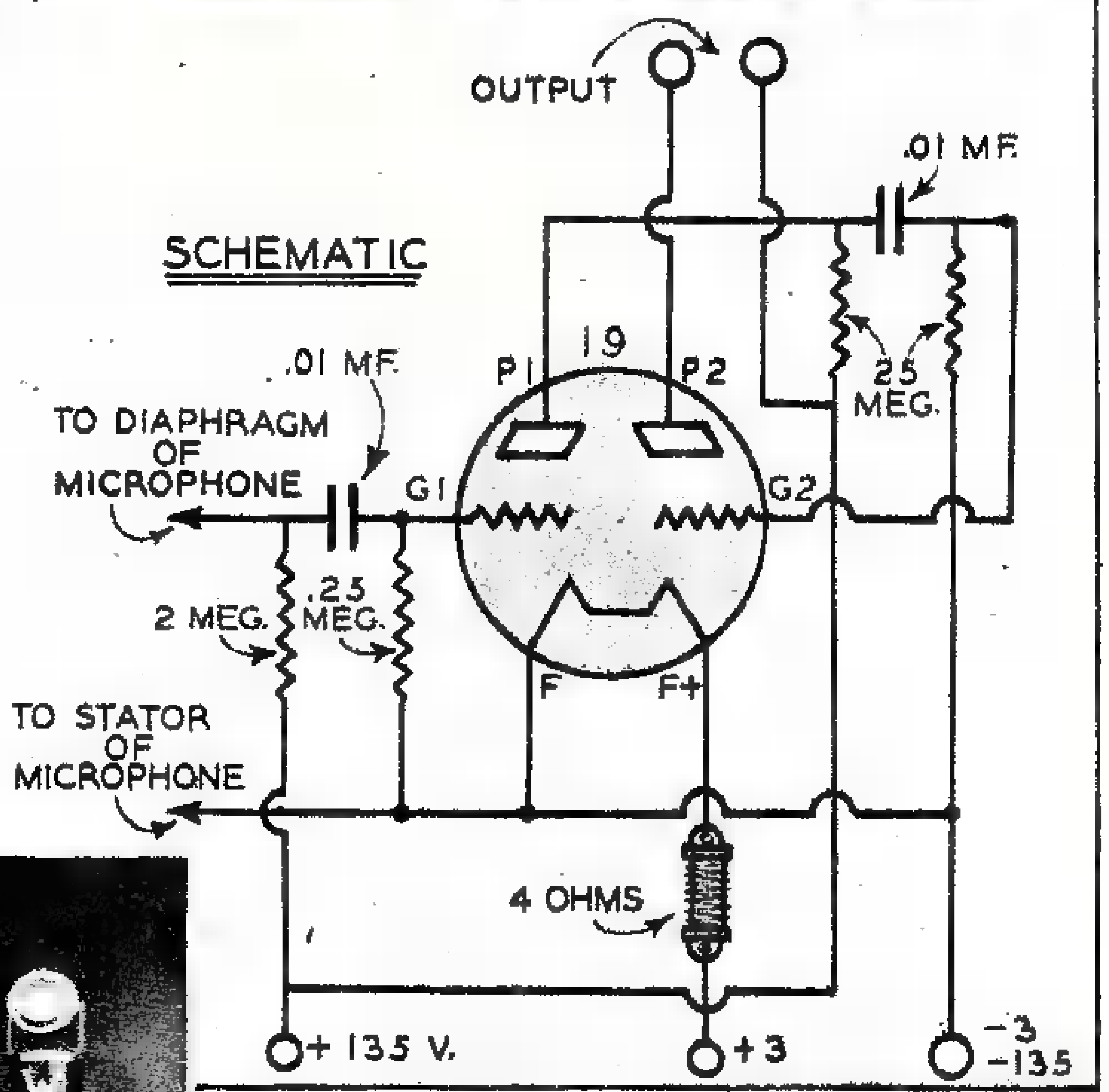
A Studio Type Microphone for the Amateur

A MICROPHONE unit of the condenser type that will rival the professional studio device in both results and appearance can be constructed by any ambitious radio experimenter in a few hours. Since the microphone "head" requires special machine work it is cheaper to purchase the kit ready for mounting. This is available from most radio supply houses at a few dollars.

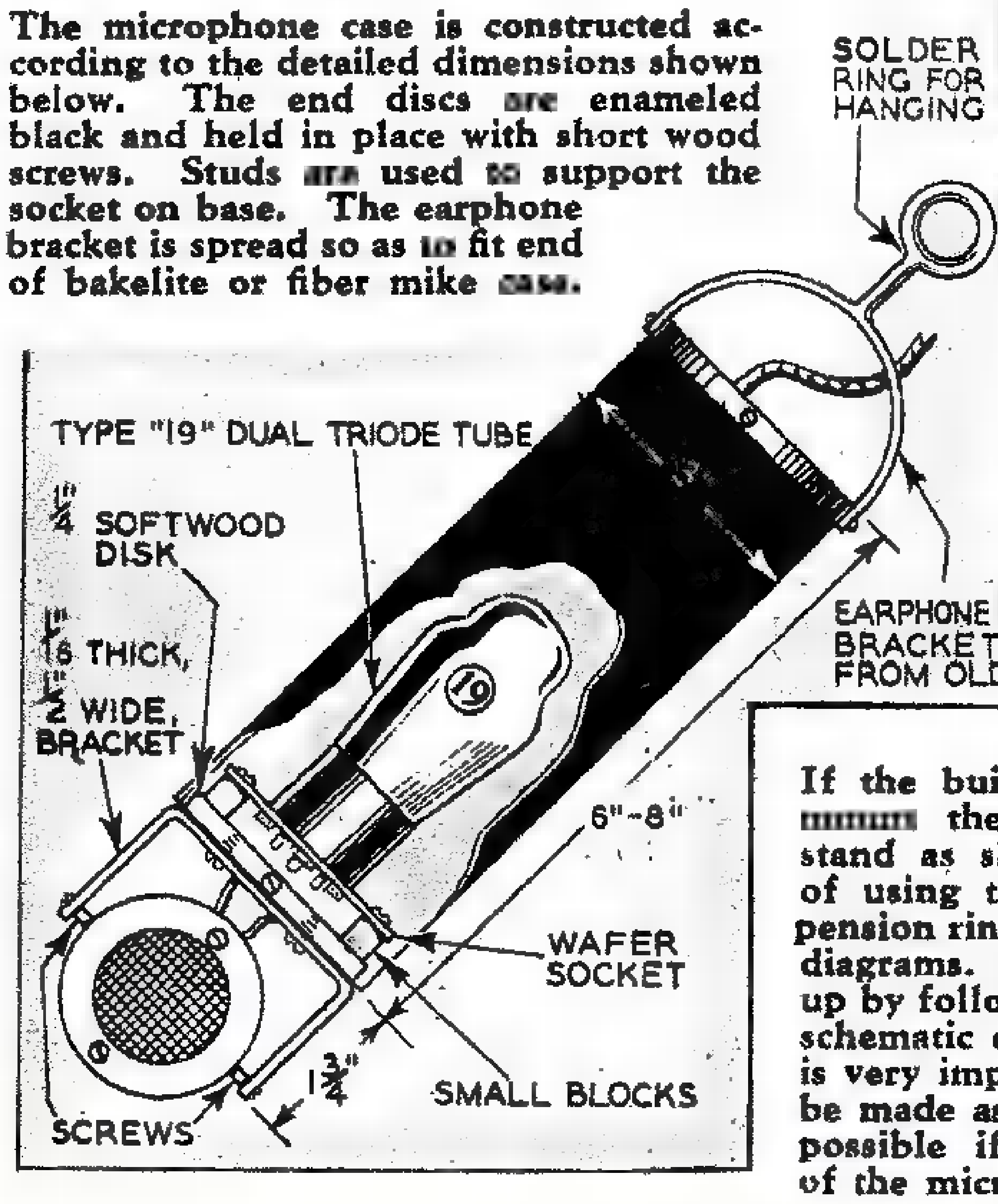
The amplifier case is made from a 3-inch bakelite or hard rubber tube 6 to 8 inches in length. Inside is mounted the various parts wired up according to the diagram. The amplifier consists of a type '19 tube connected in a resistance coupled circuit. A wooden disc mounted in the end of the bakelite tube supports the tube socket and various parts.

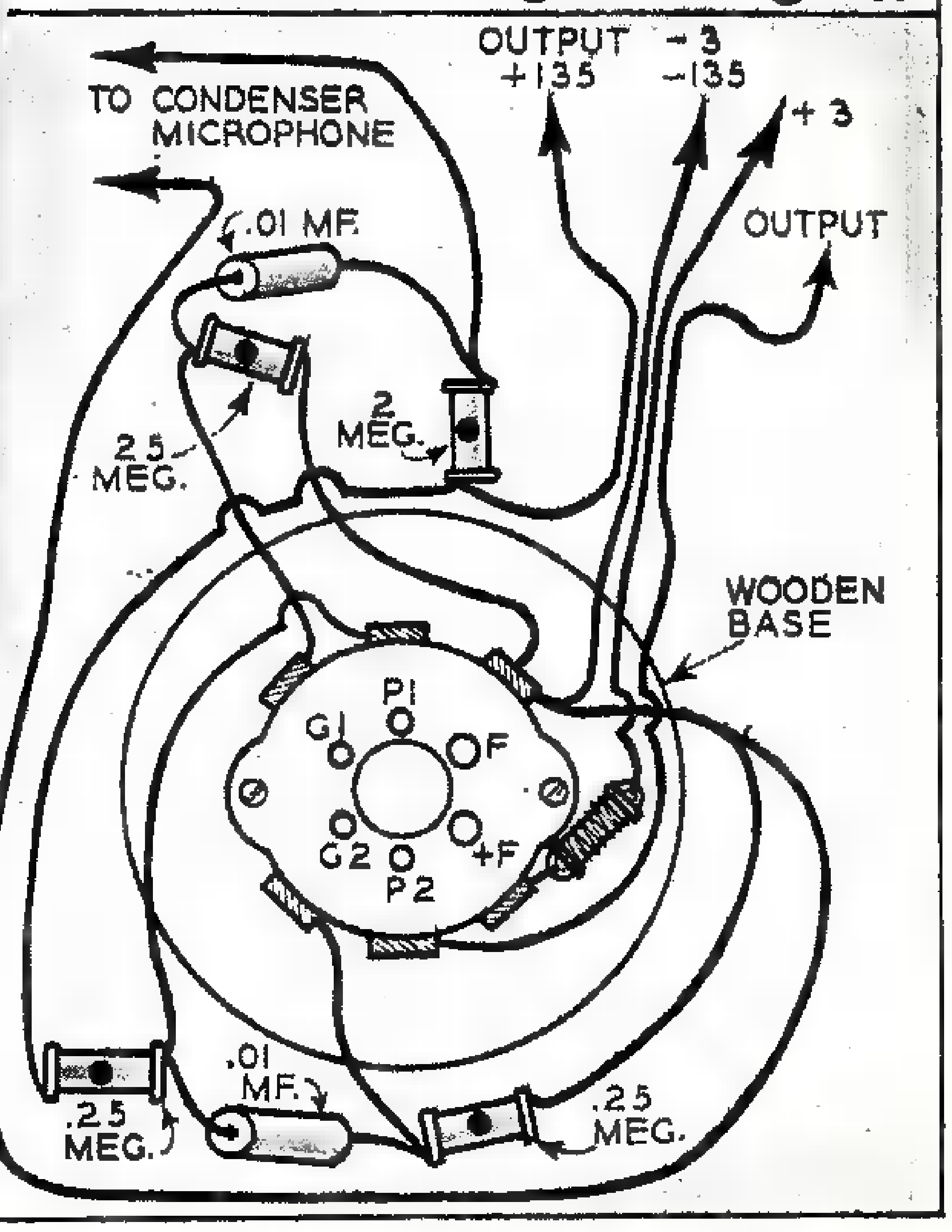
A suspension ring is made from the bracket of an old radio head set. A small metal ring is soldered to the end of the stem so that the unit can be suspended on a cord. The earphone ring permits the microphone to be tilted to any desired angle. A strip of metal $\frac{1}{16}''\times\frac{1}{2}''\times3\frac{1}{2}''$ is bent into a clamp for holding the mike "head" and mounted on the bottom of the microphone housing with short machine screws.

Metal bands around the ends of the tube help to enhance the appearance of the completed instrument. A four-wire shielded cable leads from the microphone to the regular amplifier. If the cable is of any great length a matching transformer is required. Be certain that all connections are made exactly as shown in pictorial diagram.


OUTPUT
.01 MF.
SCHEMATIC
.01 MF.
P1
19
P2
2.5 MEG.
TO DIAPHRAGM OF MICROPHONE
G1
G2
2 MEG.
2.5 MEG.
F
F+
TO STATOR OF MICROPHONE
4 OHMS
+ 135 V.
+3
-3
-135

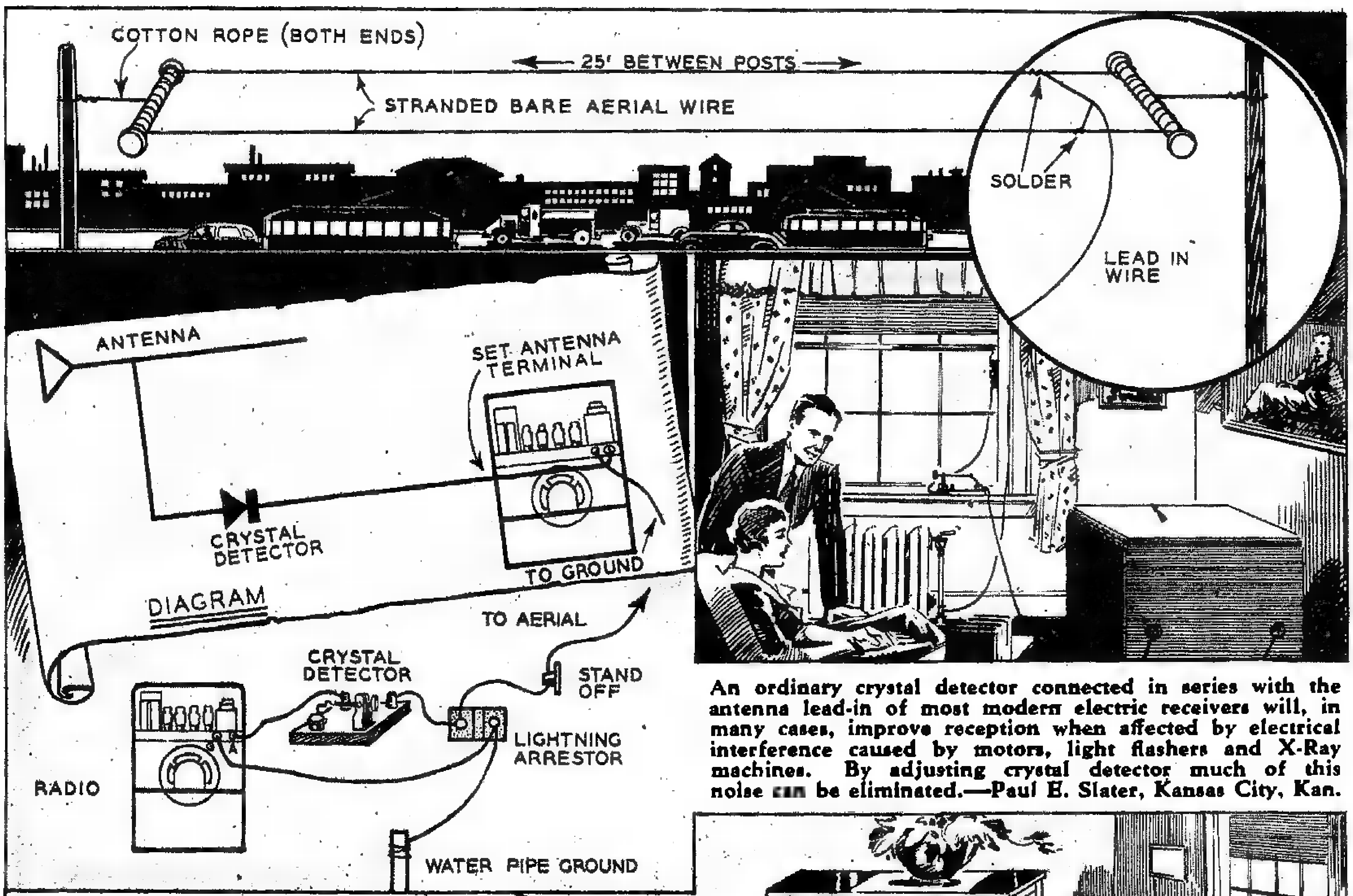
The microphone case is constructed according to the detailed dimensions shown below. The end discs are enameled black and held in place with short wood screws. Studs are used to support the socket on base. The earphone bracket is spread so as to fit end of bakelite or fiber mike case.


SOLDER RING FOR HANGING
TYPE "19" DUAL TRIODE TUBE
1/4" SOFTWOOD DISK
1/16" THICK, 1/2" WIDE, BRACKET
6"-8"
3"
19
EARPHONE BRACKET FROM OLD HEADSET
WAFER SOCKET
1 3/4"
SMALL BLOCKS
SCREWS

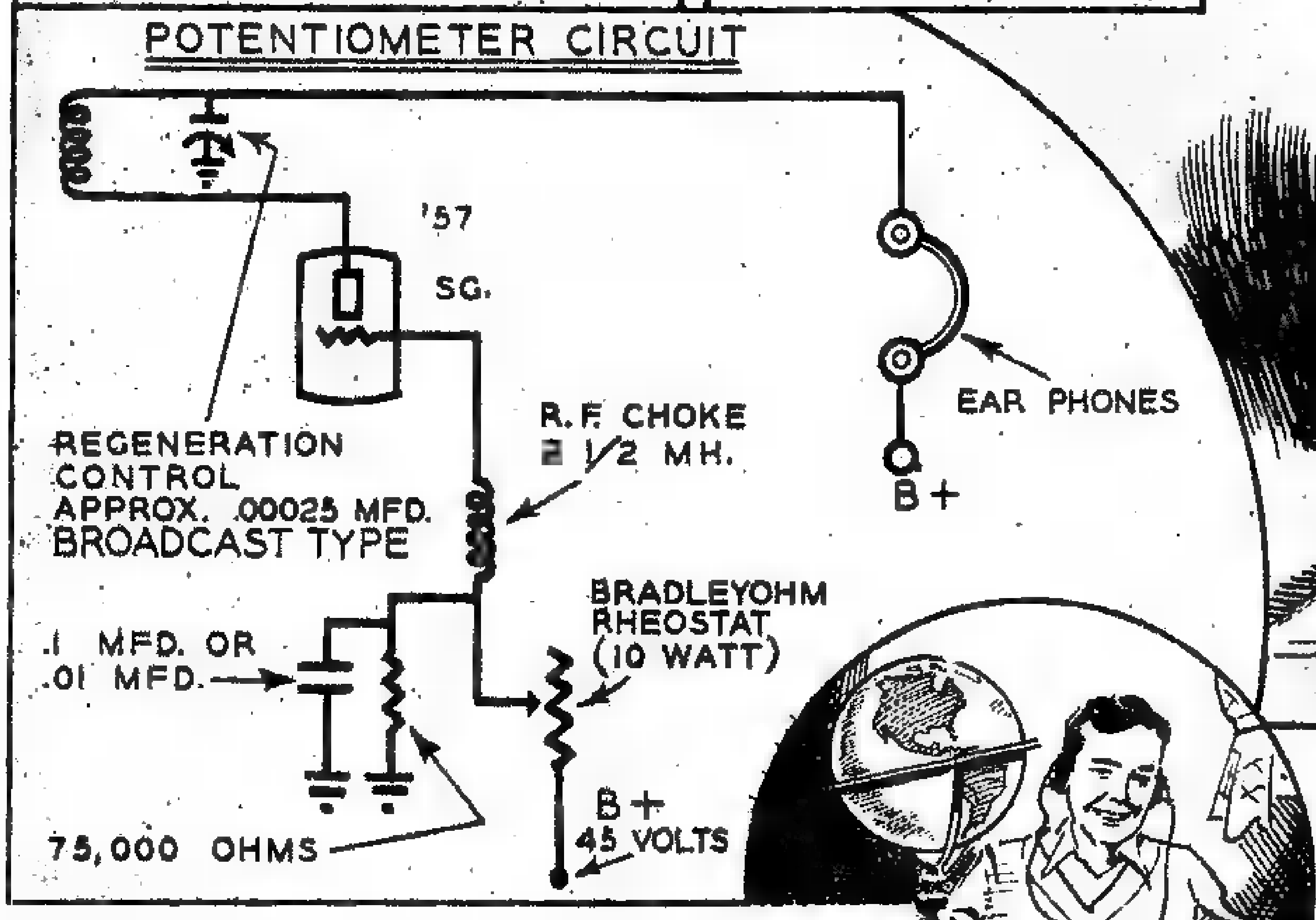

OUTPUT +135
-3 -135
+3
TO CONDENSER MICROPHONE
OUTPUT
.01 MF.
2 MEG.
2.5 MEG.
WOODEN BASE
P1
G1
F
G2
+F
P2
.01 MF.
2.5 MEG.
2.5 MEG.

If the builder desires he can mount the microphone on a stand as shown above instead of using the microphone suspension ring as suggested in the diagrams. The parts are wired up by following the pictorial or schematic diagrams at left. It is very important that all leads be made as short and direct as possible if efficient operation of the microphone is expected.

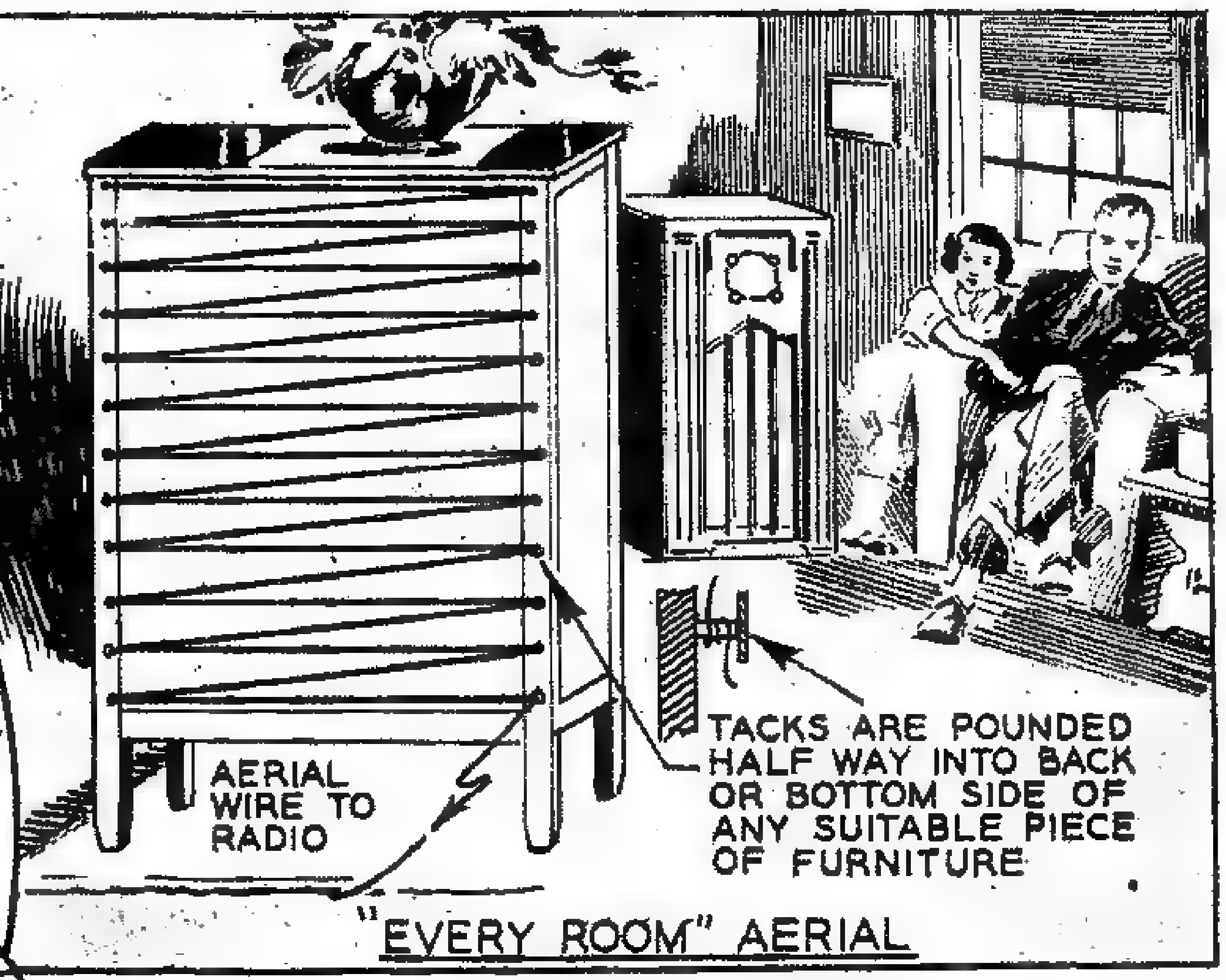
Kinks Suggested By MM Radio Experimenters


COTTON ROPE (BOTH ENDS)
25' BETWEEN POSTS
STRANDED BARE AERIAL WIRE
SOLDER
LEAD IN WIRE
ANTENNA
SET ANTENNA TERMINAL
CRYSTAL DETECTOR
TO GROUND
DIAGRAM
TO AERIAL
CRYSTAL DETECTOR
STAND OFF
LIGHTNING ARRESTOR
RADIO
WATER PIPE GROUND

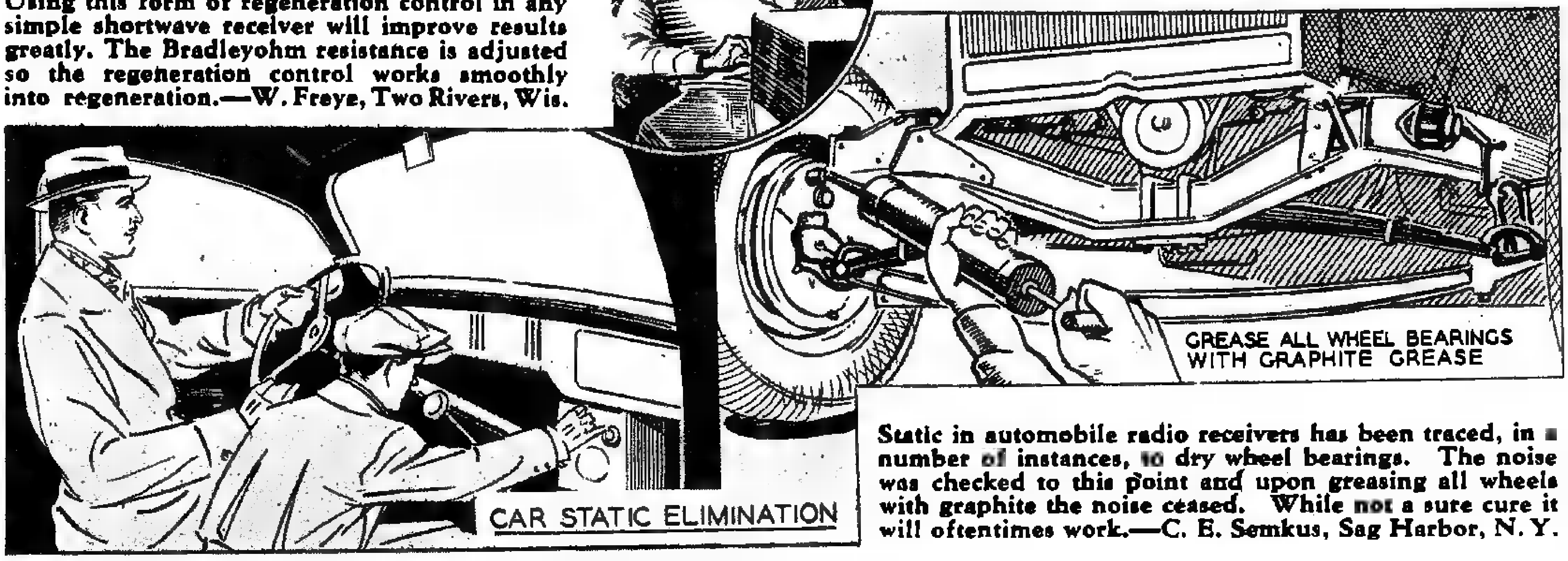
An ordinary crystal detector connected in series with the antenna lead-in of most modern electric receivers will, in many cases, improve reception when affected by electrical interference caused by motors, light flashers and X-Ray machines. By adjusting crystal detector much of this noise can be eliminated.—Paul E. Slater, Kansas City, Kan.


POTENTIOMETER CIRCUIT
'57
SG.
REGENERATION CONTROL APPROX. .00025 MFD. BROADCAST TYPE
R.F. CHOKE 2 1/2 MH.
EAR PHONES
B+
.1 MFD. OR .01 MFD.
BRADLEYOHM RHEOSTAT (10 WATT)
B+ 45 VOLTS
75,000 OHMS

Using this form of regeneration control in any simple shortwave receiver will improve results greatly. The Bradleyohm resistance is adjusted so the regeneration control works smoothly into regeneration.—W. Freye, Two Rivers, Wis.


AERIAL WIRE TO RADIO
TACKS ARE POUNDED HALF WAY INTO BACK OR BOTTOM SIDE OF ANY SUITABLE PIECE OF FURNITURE
"EVERY ROOM" AERIAL

The reception of many types of radio receivers will be improved greatly through the use of this simple self-contained antenna. Tacks driven in the back of the cabinet support the antenna which is threaded back and forth.—A. Ogren, Chicago.

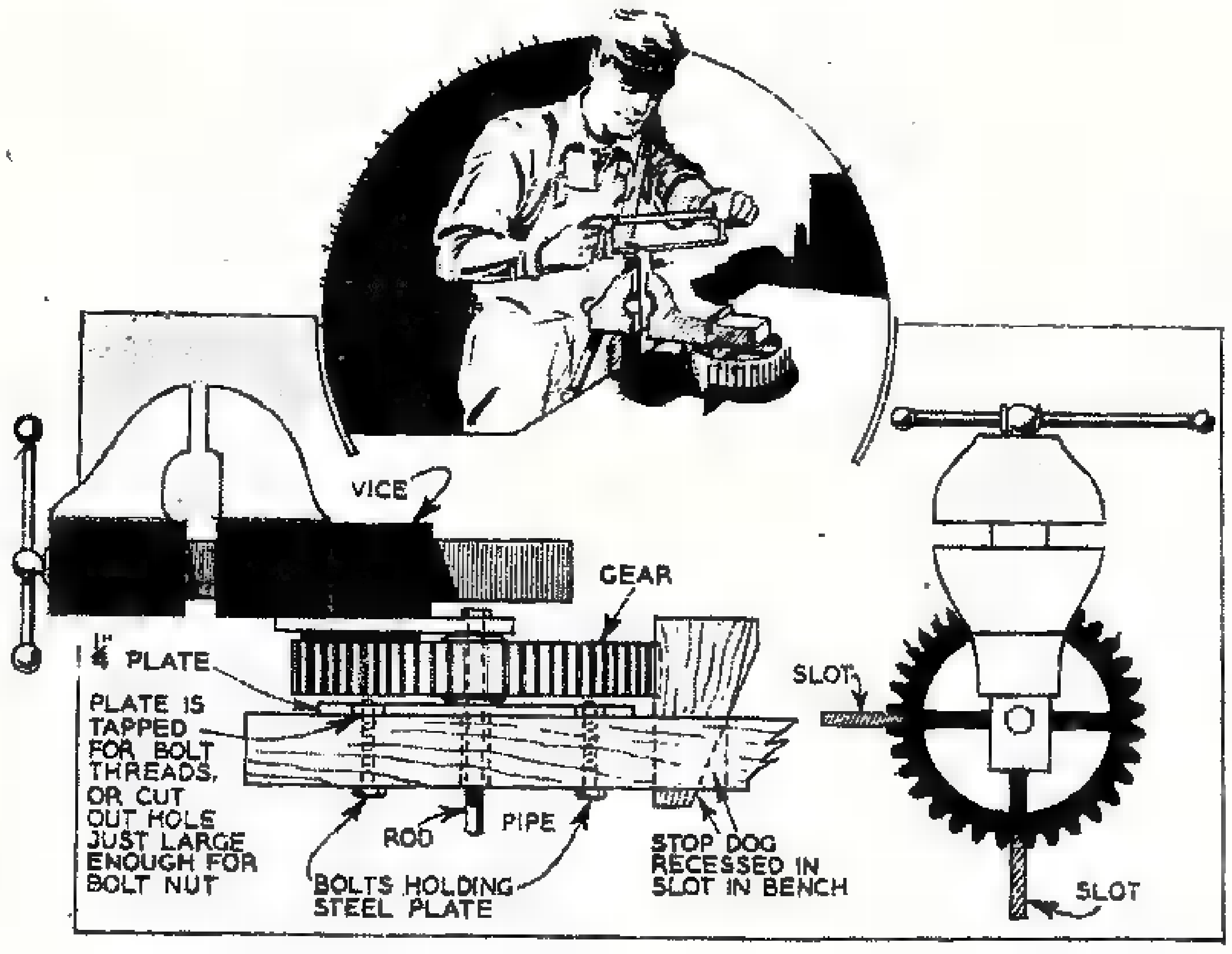

GREASE ALL WHEEL BEARINGS WITH GRAPHITE GREASE
CAR STATIC ELIMINATION

Static in automobile radio receivers has been traced, in a number of instances, to dry wheel bearings. The noise was checked to this point and upon greasing all wheels with graphite the noise ceased. While not a sure cure it will oftentimes work.—C. E. Semkus, Sag Harbor, N. Y.

PRACTICAL IDEAS FOR SHOP USE

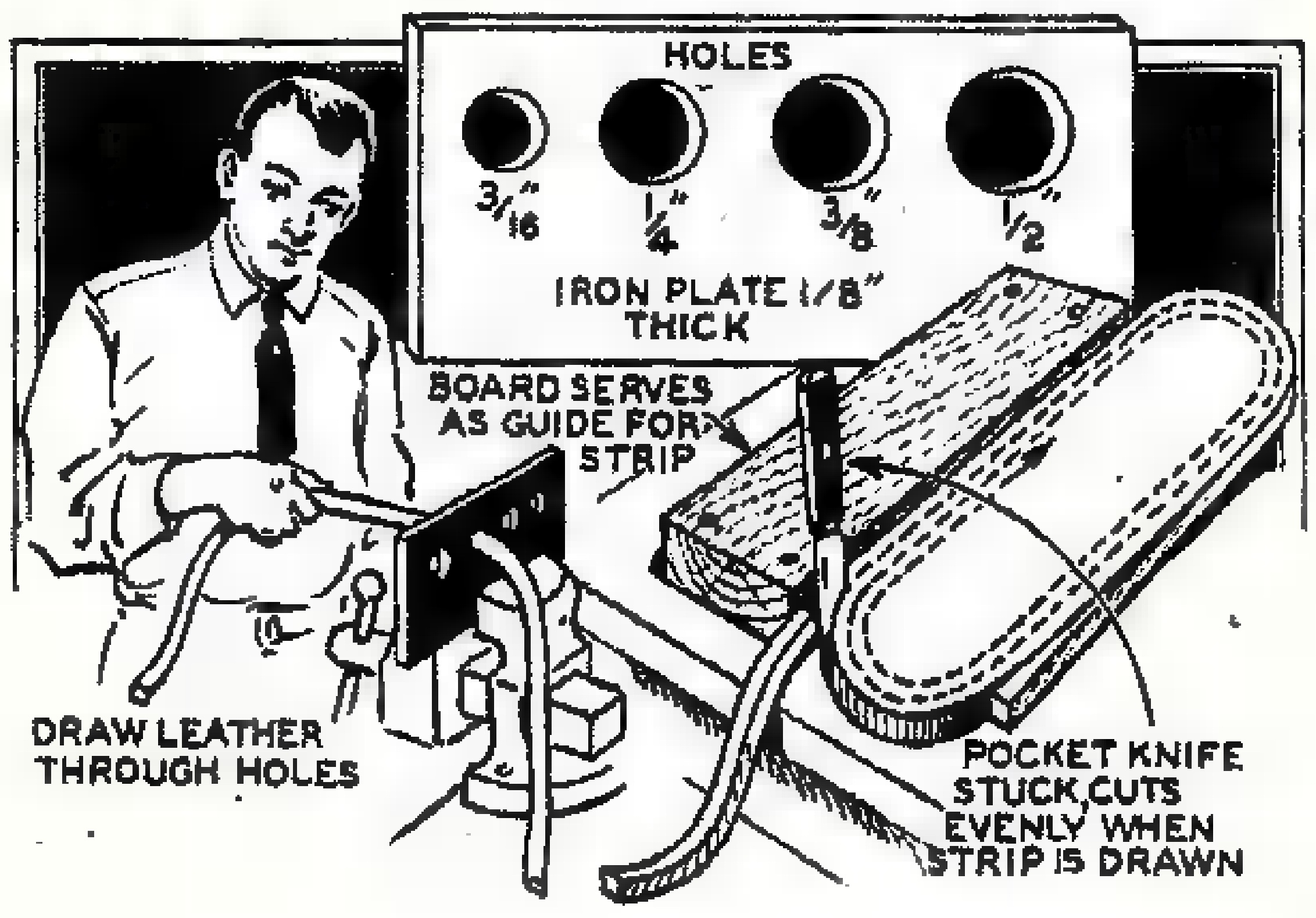
Gear Makes Swivel for Vise

A LARGE gear wheel, which may be secured from any junk yard, forms the necessary materials needed in converting any stationary bench vise into one of the rotating type. Remove the vise and attach a steel or iron plate slightly smaller than the root diameter of the gear, itself. A bolt passes through the plate permitting its rotation while the vise is mounted in turn to the plate. Cut two grooves to take the "stop dogs" so that the vise can be held at any angle.—W. Wilhite.

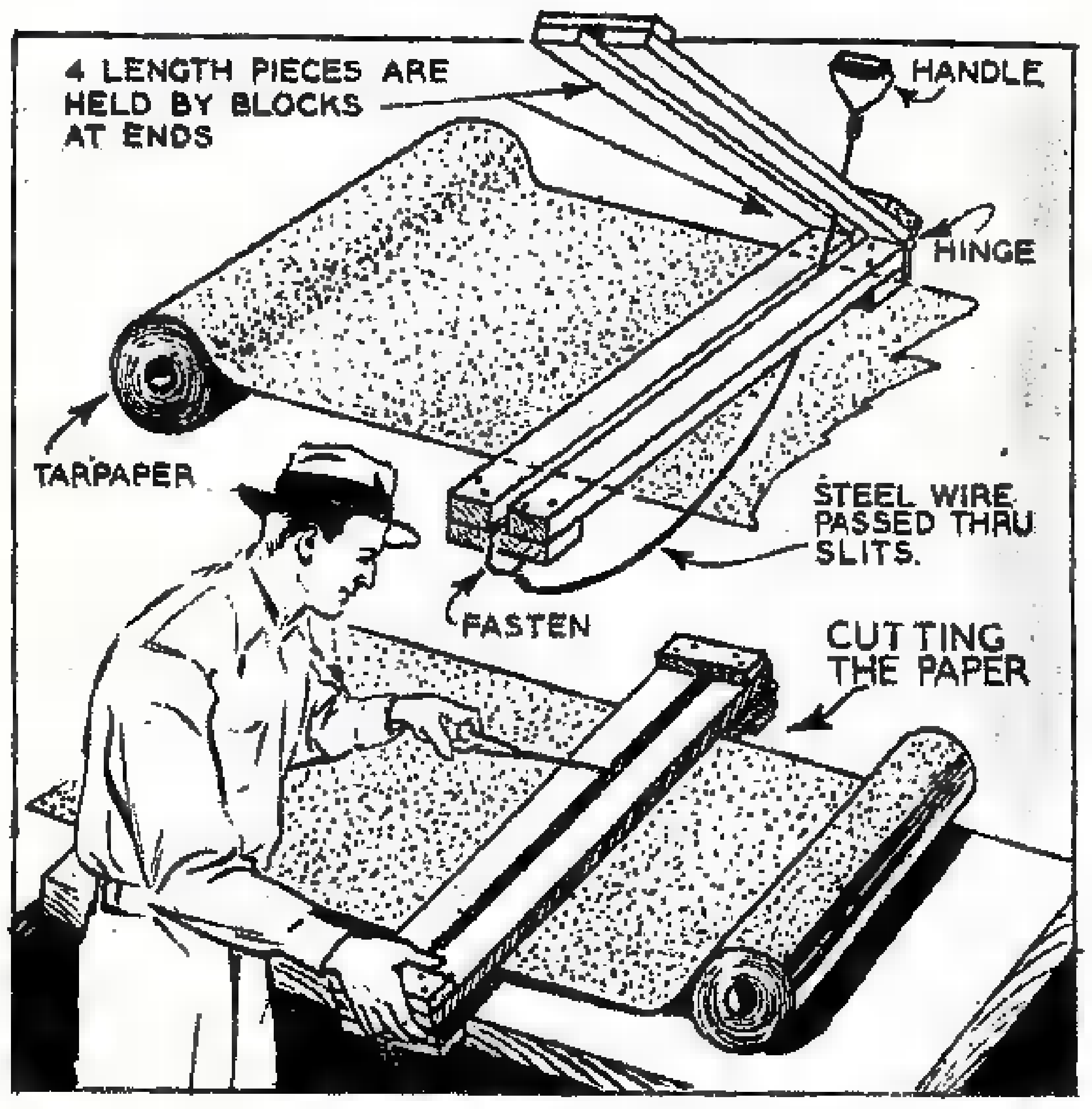

VICE
GEAR
1/4" PLATE
PLATE IS TAPPED FOR BOLT THREADS, OR CUT OUT HOLE JUST LARGE ENOUGH FOR BOLT NUT
ROD
PIPE
BOLTS HOLDING STEEL PLATE
STOP DOG RECESSED IN SLOT IN BENCH
SLOT
SLOT

Simple Device Cuts Round Belting

THE shop man can make his own round leather belts for his light shop machinery by using this simple homemade cutting tool. A piece of sheet iron about 3"x5" and 1/8" thick has a number of holes drilled in it varying in size from 1/2" to 3/16". Cut strips of leather with a pocket knife in the manner shown, mount metal plate in a vise and pull the strips through the desired size hole.


HOLES
3/16"
1/4"
3/8"
1/2"
IRON PLATE 1/8" THICK
BOARD SERVES AS GUIDE FOR STRIP
DRAW LEATHER THROUGH HOLES
POCKET KNIFE STUCK,CUTS EVENLY WHEN STRIP IS DRAWN

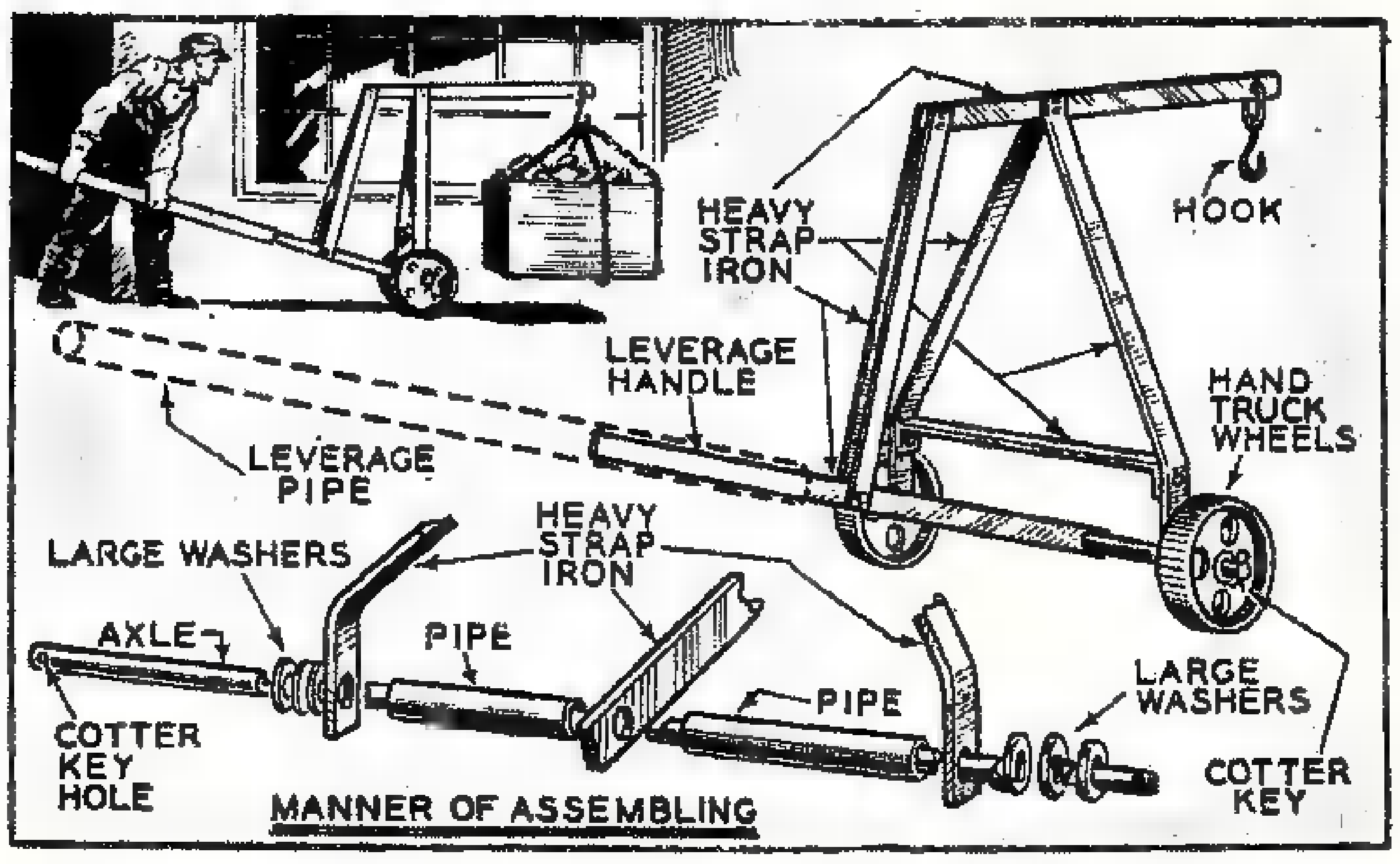
Roofing Paper Cut On Wire Rig


4 LENGTH PIECES ARE HELD BY BLOCKS AT ENDS
HANDLE
HINGE
TARPAPER
STEEL WIRE PASSED THRU SLITS.
FASTEN
CUTTING THE PAPER

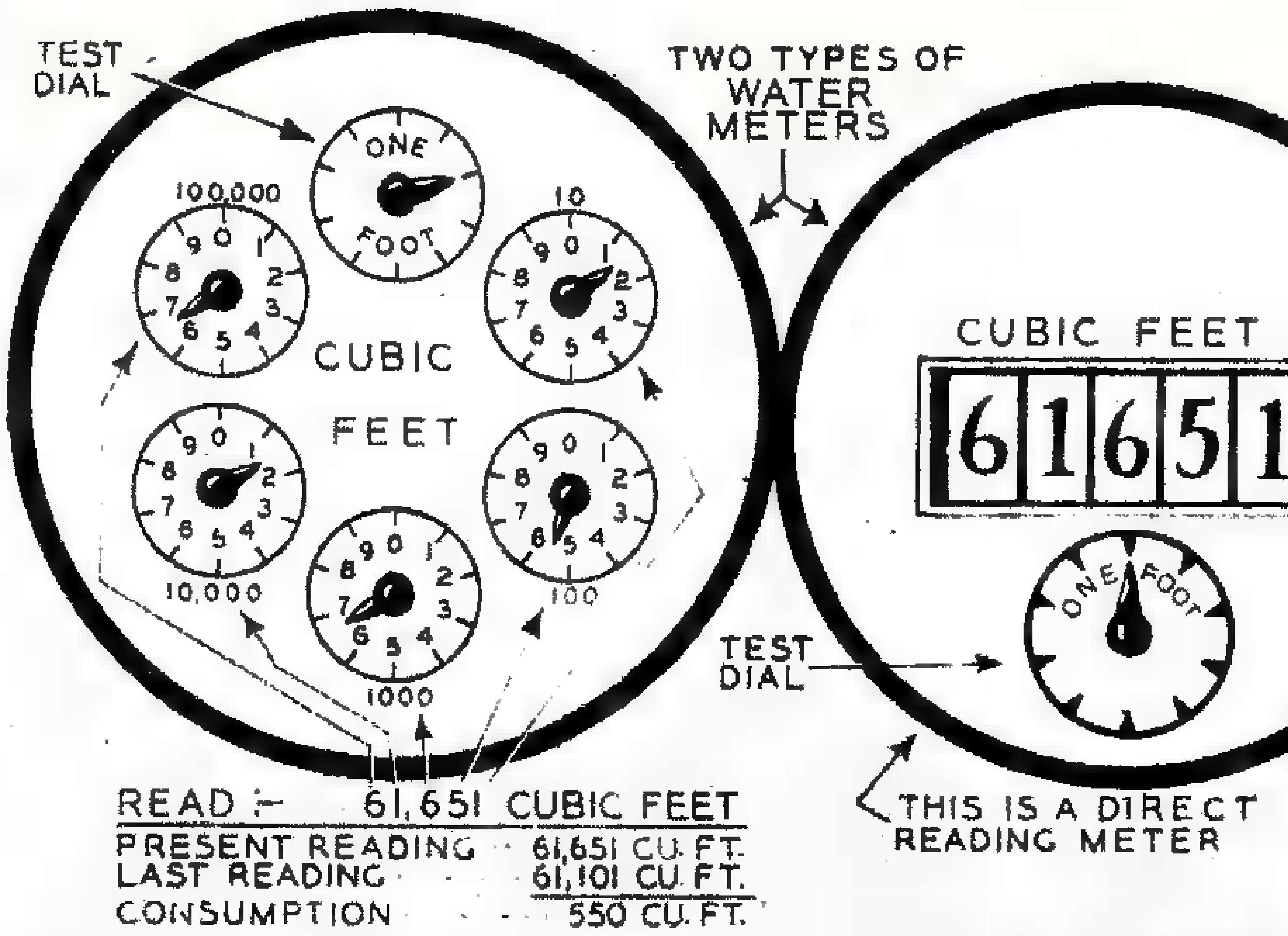
CUTTING tar paper or any other heavy stock is made easy with this cutter which uses a wire instead of the usual blade yet makes a clean cut. The cutter consists of four identical pieces of stock mounted as shown and provided with a hinge at one end to facilitate operation. A light steel wire is attached to the open end of the frame and the wire passed beneath the frame with a wooden handle attached to the other end. To use the paper cutter place the roll of tar paper on a flat surface and unroll to the desired length. Slip the paper between the hinged section then close and hold firmly. A sharp pull on the handle will result in a perfect tear. It is important that the cutting wire is steel as a copper wire will break too easily.—Adolph Tabako.

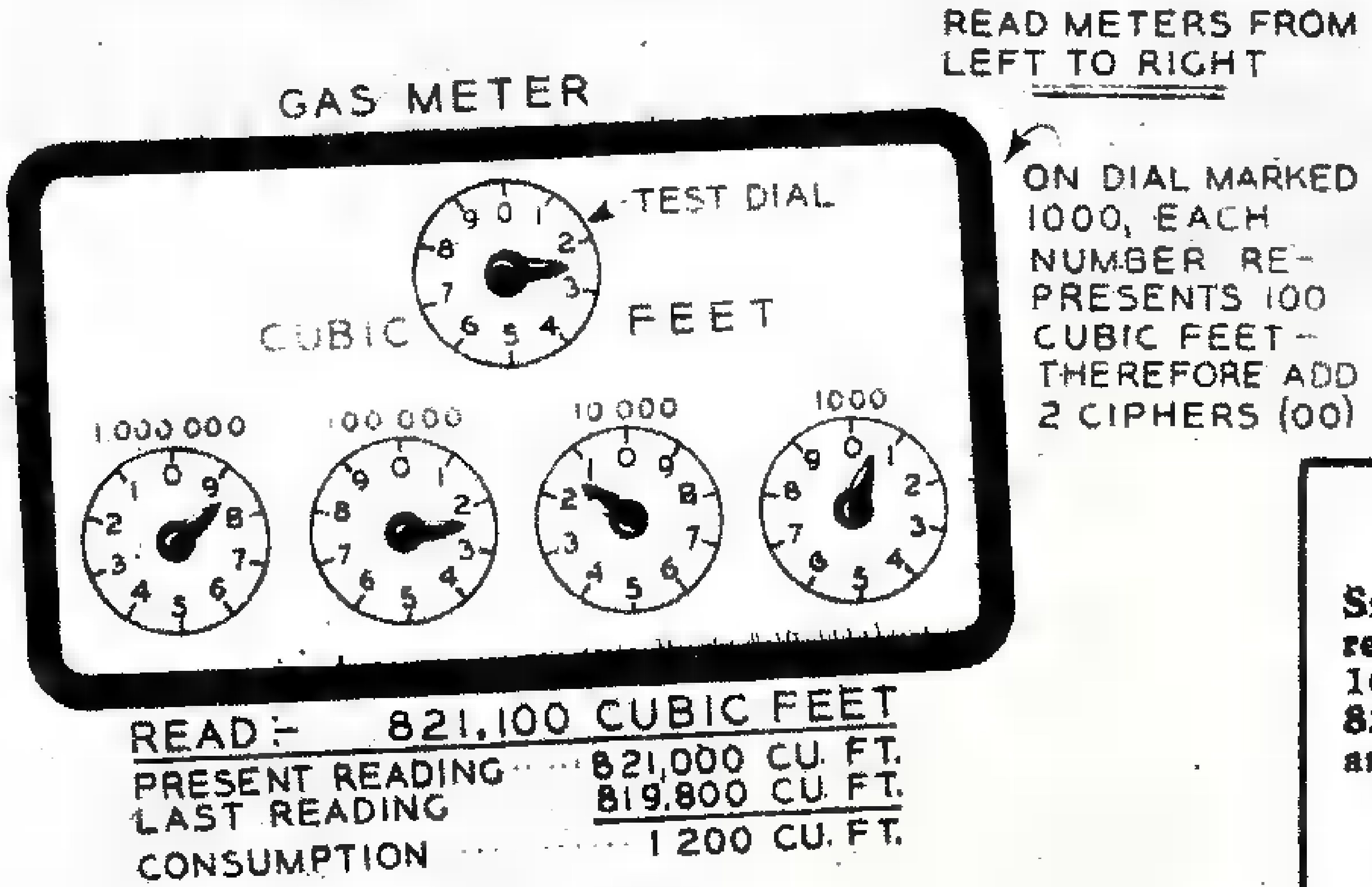
A Small Crane for Shop Use

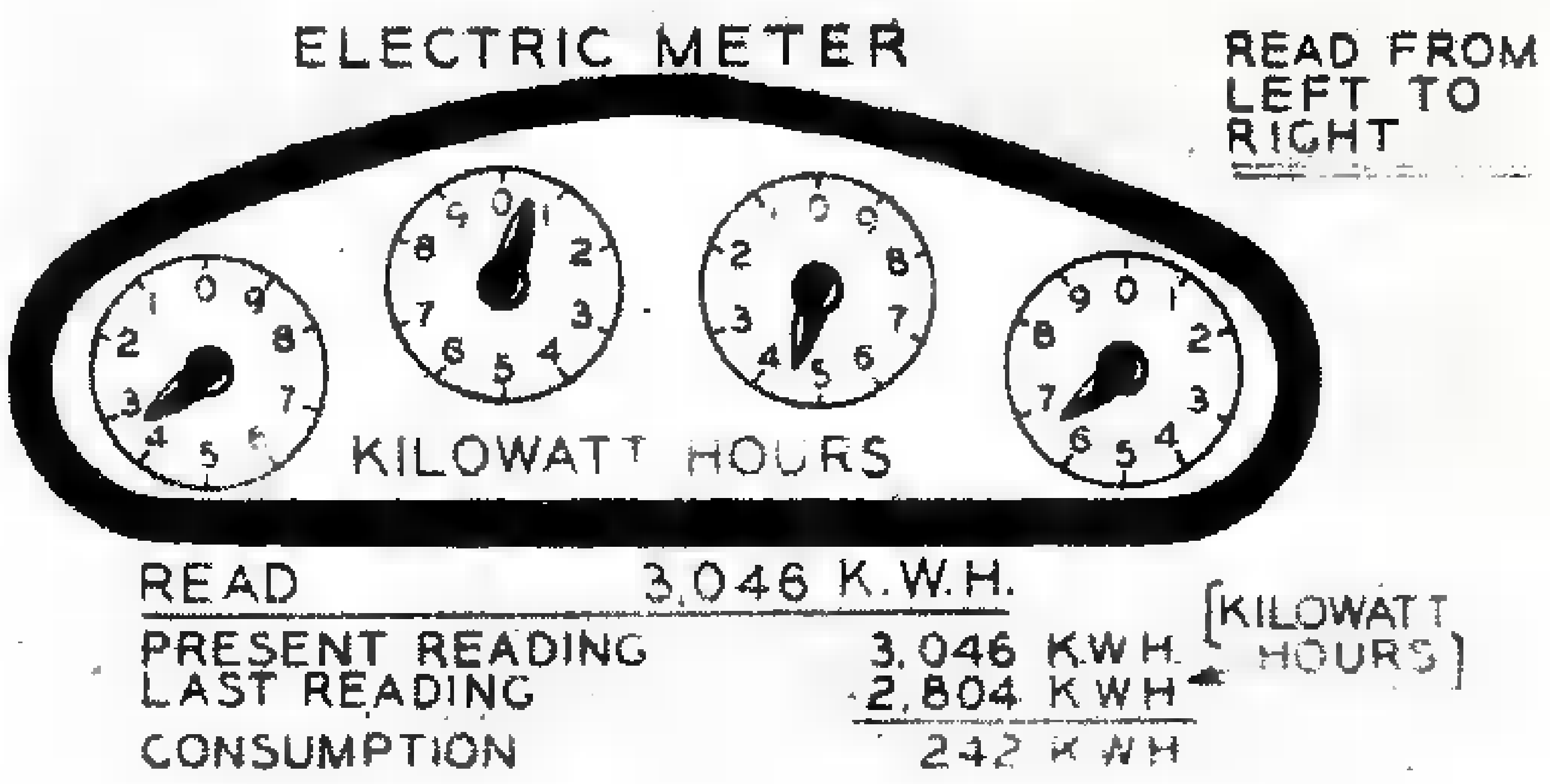
MADE from heavy angle iron and a few lengths of pipe this small portable crane will simplify the lifting and transporting of heavy objects about the machine shop or garage. No dimensions are given as the size is dependent upon the use to which the crane will be put. The entire crane can be put together with stove bolts or welded. To lift heavy objects the leverage handle should be long. For light objects the handle may be a short one.—T. L. Moore.

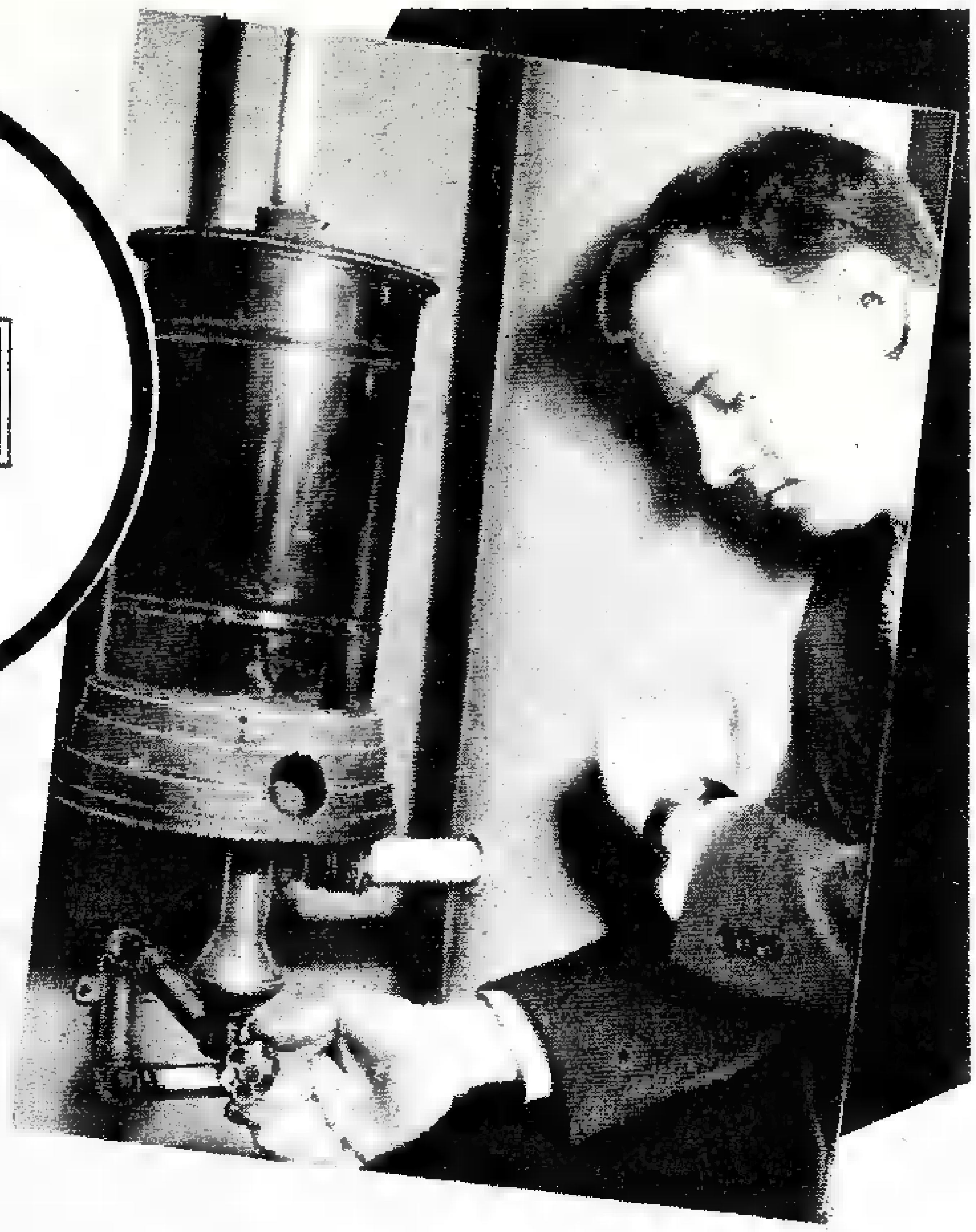

HEAVY STRAP IRON
HOOK
LEVERAGE HANDLE
HAND TRUCK WHEELS
LEVERAGE PIPE
HEAVY STRAP IRON
LARGE WASHERS
AXLE
PIPE
PIPE
LARGE WASHERS
COTTER KEY HOLE
COTTER KEY
MANNER OF ASSEMBLING

Reading Your Home Gas and Electric Meters for Profit


TEST DIAL
TWO TYPES OF WATER METERS
ONE FOOT
100,000
10
CUBIC FEET
10,000
100
1000
CUBIC FEET
61651
ONE FOOT
TEST DIAL
READ :- 61,651 CUBIC FEET
PRESENT READING 61,651 CU. FT.
LAST READING 61,101 CU. FT.
CONSUMPTION 550 CU. FT.
THIS IS A DIRECT READING METER


READ METERS FROM LEFT TO RIGHT
GAS METER
TEST DIAL
CUBIC FEET
1,000,000
100 000
10 000
1000
ON DIAL MARKED 1000, EACH NUMBER REPRESENTS 100 CUBIC FEET - THEREFORE ADD 2 CIPHERS (00)
READ :- 821,100 CUBIC FEET
PRESENT READING 821,000 CU. FT.
LAST READING 819,800 CU. FT.
CONSUMPTION 1 200 CU. FT.


ELECTRIC METER
READ FROM LEFT TO RIGHT
KILOWATT HOURS
READ 3,046 K.W.H.
PRESENT READING 3,046 K.W.H.
LAST READING 2,804 K.W.H.
[KILOWATT HOURS]
CONSUMPTION 242 K.W.H.



GAS METER READING

Read the numbered dials, right to left ignoring test dial. Smaller of the two figures between which hands stand are read. Last dial is marked 1,000; each point is equal to 100 cu. ft. Adding 00 to numbers shows consumption as 821,000 cu. ft. Subtracting last reading from this shows amount of gas used.

WATER METER READING

Two types of water meters are in service. One kind is read directly and the other in the same manner as the gas meter.

ELECTRIC METER READING

Read in the same manner as gas meters except that no ciphers are added to numbers read. Determine current consumption by reading smaller figures between which pointers stand.

BY UNDERSTANDING the operation of your gas, electric and water meter and checking the readings from month to month quite a few dollars can be saved in the yearly public service bill. To many this seems like too difficult a task to attempt, but meter reading is quite simple after you once get the knack of it.

The first thing to do is to determine the amount of fuel a certain appliance consumes. Let us take the water heater for example. Turn off all other appliances, light the heater and then retire to the basement. Read the meter dial settings, making a note of them on a slip of paper. Allow the heater to burn for ten minutes then shut it off. Now note the dial reading and subtract this from the first setting. By repeating the process, but adjusting the flow of gas through burner the most economical consumption can be determined.

It is not the wide jet that speeds the cooking. In most instances a jet only partly open will cook foods quicker than one open fully yet save gas at the same time.

While the electricity flow cannot be adjusted in the same manner as gas, money can be saved if you are paying for your current on a minimum basis. In this way there is no current paid for that is not used. By checking your meter you can use the exact amount of current allowed in your minimum charge by the power company. This same rule applies, too, to minimum charges made for your water supply.

Plans for "LITTLE BEAR"

by
MERRITT
GREEN

TO HOLD the tiller of a sensitive racing yacht, is now a thrill to be had by anybody who builds a Moth boat according to the accompanying plans. It is the smallest sailing yacht with an International Racing Association.

As five of these inexpensive little craft form a divisional fleet, it is an easy matter to have sailing races on almost any lake or river in the country, and at the same time have a boat for use in state, national and international regattas.

The Moth described in this article, which can be built with ordinary tools, was designed by Captain Joel Van Sant, originator of the Moth Class. It is specifically known as the Potomac River model and is quite fast. With watertight bulkheads at Stations No. 2 and No. 5 it is unsinkable and, although of the scow, or skimming dish type, its lines are graceful and pleasing.

An experienced boat builder only needs to glance at Figures 1 and 2 to build the hull. But certain specifications are necessary for those unfamiliar with this type of craft.

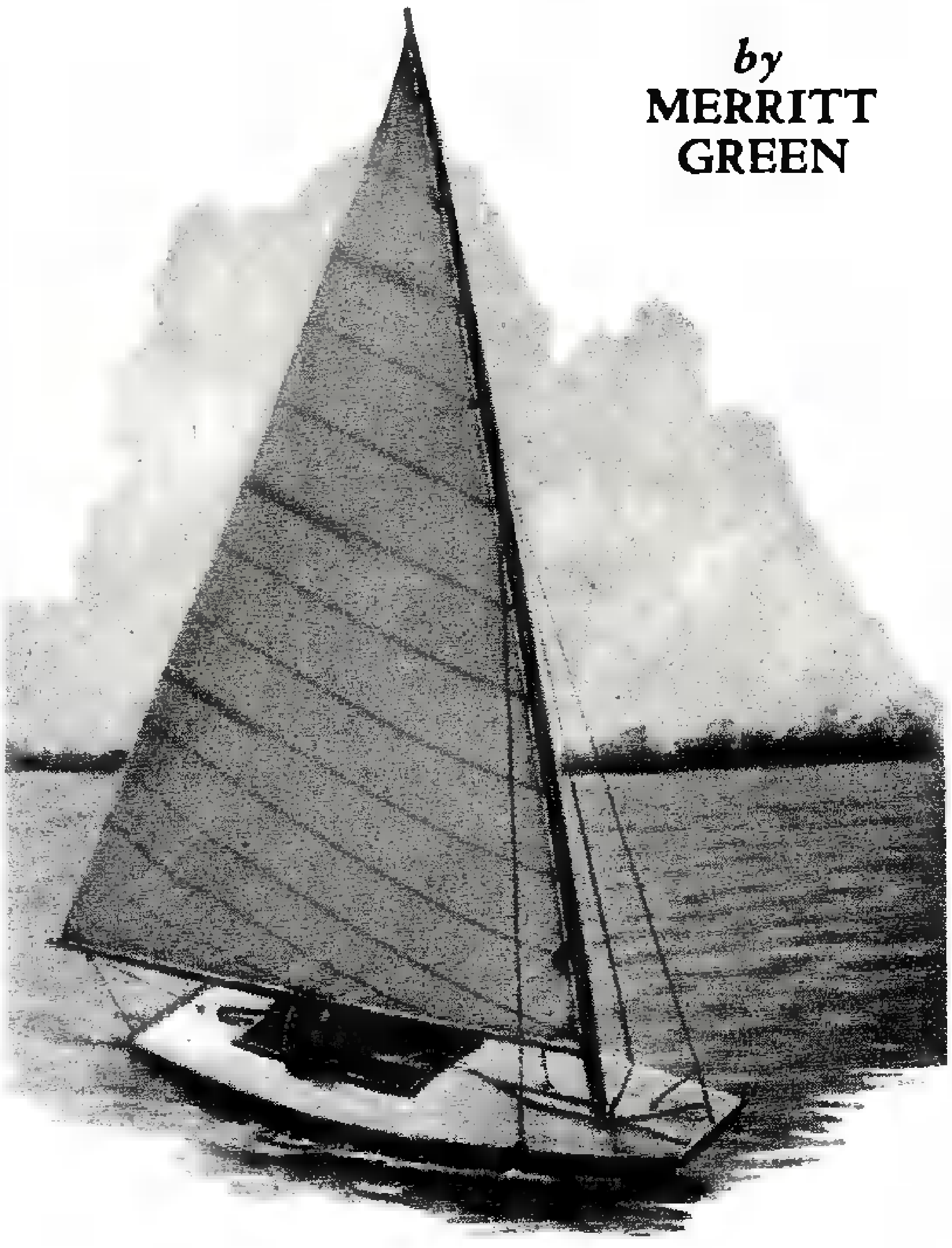
Before going ahead with any of the actual construction work the very first step is to thoroughly study the drawings—particularly those in Figure 2 which give all the necessary dimensions for laying out the full size plans —an essential preliminary in building any boat.

The line dimensions, you will notice, are given as to the *outside* of the planking. Therefore, in laying out the frames, it will be necessary to deduct the thickness of the planking used—in this instance one-half inch at all points involved.

A study of Fig. 4 will clear up this matter for any who find it obscure. In this diagram the lines dimensions at Station No. 3 are given and the limits of the planking indicated.

From your full size drawing you now make paper patterns for the frames and the keel, always remembering to allow for the planking thickness.

Full details of the frame construction are covered in the drawings—particularly clearly in Figures 4, 5 and 6. The bow plate, covered in Fig. 10, is sawed out of a piece of solid white oak. The transom is simply a piece of 1″ white oak or mahogany cut to the angle produced on your full size drawing.



Above photo shows the original Moth as designed by Captain Joel Van Sant in 1930. The Moth type yacht is the smallest sailing craft with an International Racing Association.

It is best to put the bevels on bow plate, transom and frames after they are set up. The frames are joined with brass screws as shown.

With the frames built you can turn your attention to the remaining essential frame member—the keel. The keel is formed from one 12-foot length of fir or yellow pine, 4½ inches wide by ⅝″ thick, and a 12-foot length of ½-inch white oak, 2½ inches wide. The two are firmly screwed together forming the section shown in Fig. 8. Fig. 7 shows the method used to set up the keel. A 12-foot length of 2″x12″, or 14″, planking is sawn out so that the exact curve or line of the keel, fore and aft, remains, the necessary measurements being taken off the plans.

With the keel set up in the mould, or jig, fasten the frames in place using brass screws throughout.

The bow plate and stern transom are next screwed to the keelson and braced firmly with 1¼″ or 1½″ oak knees as shown in the inboard profile drawing, Fig. 1.

With bow plate, transom and all frames in place, temporary braces are secured to the sides to hold the frames rigid while notching

a "MOTH" Class RACER

them for the chine and the deck clamp. These notches should be ¾" by 1" and are clearly indicated in frame detail.

Next fit the chine pieces and the deck clamps, bevelling the frames as needed. Two 9"x12" planks are then clamped in position, marked off and sawed to shape. These will form the sides of your boat and they may be of white cedar, mahogany or redwood—½" thick. (Note: Either ⅜" or ½" planking is specified but the accompanying drawings show half-inch planking throughout.) Fasten the planks to the frames, deck clamp and chine with brass screws, then loosen the keel former supports and turn the boat over, still leaving it attached to the jig you have employed to shape it.

The frames may now be notched on the under sides for the seam battens, as shown in Fig. 5. The number of planks used on the bottom, of course, determines the number of seam battens, but if you use 8-inch planking as shown, there will be two battens on each side of the frames. The battens, of ½"x2" spruce are fastened with brass screws.

You are now ready for the bottom planking. This may be either mahogany, cedar or

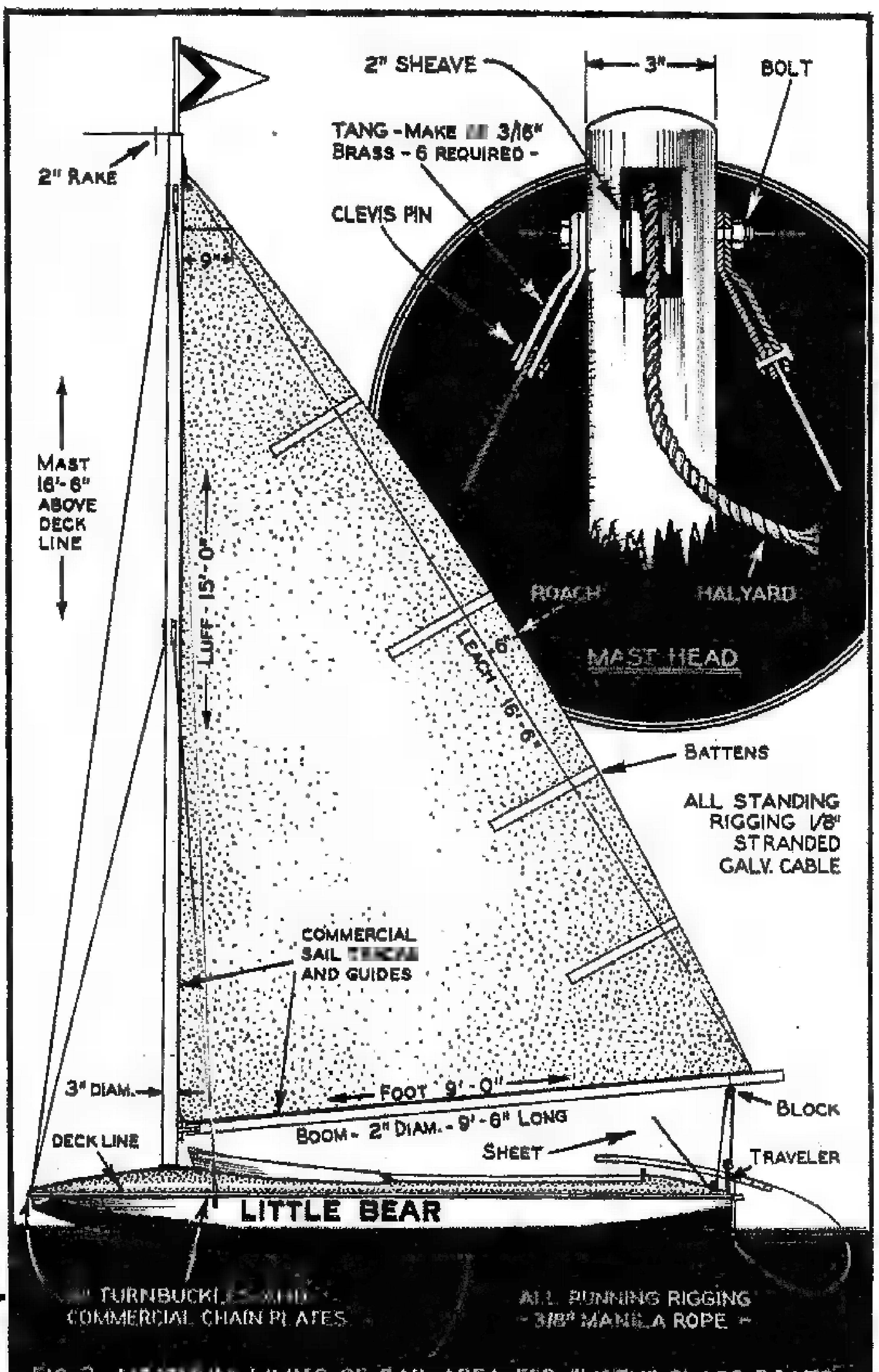

2" SHEAVE
3"
BOLT
TANG - MAKE OF 3/16" BRASS - 6 REQUIRED -
CLEVIS PIN
ROACH
HALYARD
MAST HEAD
2" RAKE
MAST 16'-6" ABOVE DECK LINE
LUFF 15'-0"
LEACH 16'-6"
BATTENS
ALL STANDING RIGGING 1/8" STRANDED GALV. CABLE
COMMERCIAL SAIL TRACK AND GUIDES
3" DIAM.
FOOT 9'-0"
BLOCK
DECK LINE
BOOM - 2" DIAM. - 9'-6" LONG
SHEET
TRAVELER
LITTLE BEAR
TURNBUCKLES AND COMMERCIAL CHAIN PLATES
ALL RUNNING RIGGING - 3/8" MANILA ROPE -

FIG. 3 MAXIMUM LIMITS OF SAIL AREA FOR "MOTH" CLASS BOATS

FIG. 2 – COMPLETE PROFILE AND CROSS-SECTION LINES
"LITTLE BEAR" — A MOTH RACER
DIMENSIONS ARE TO OUTSIDE OF PLANKING

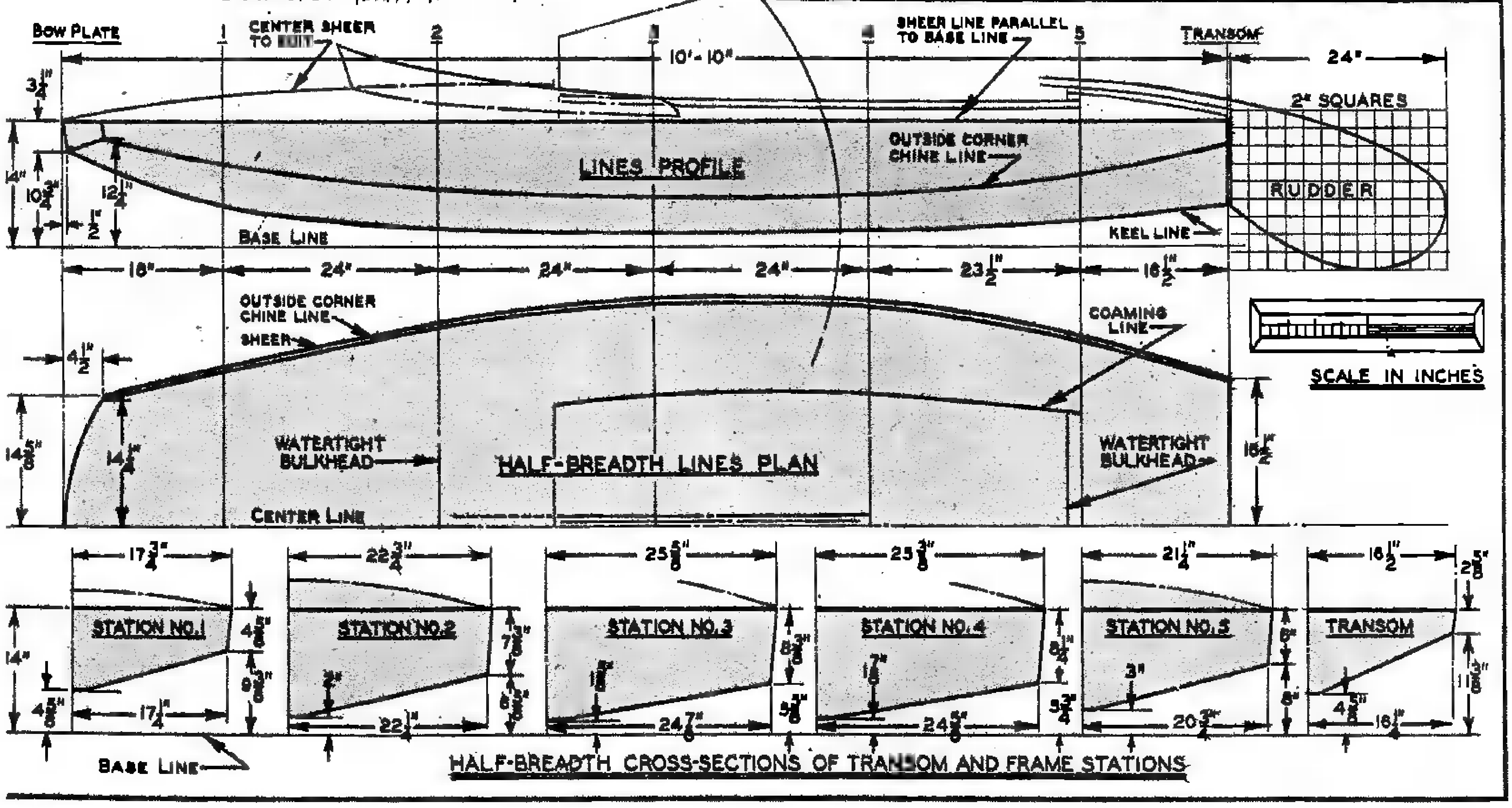
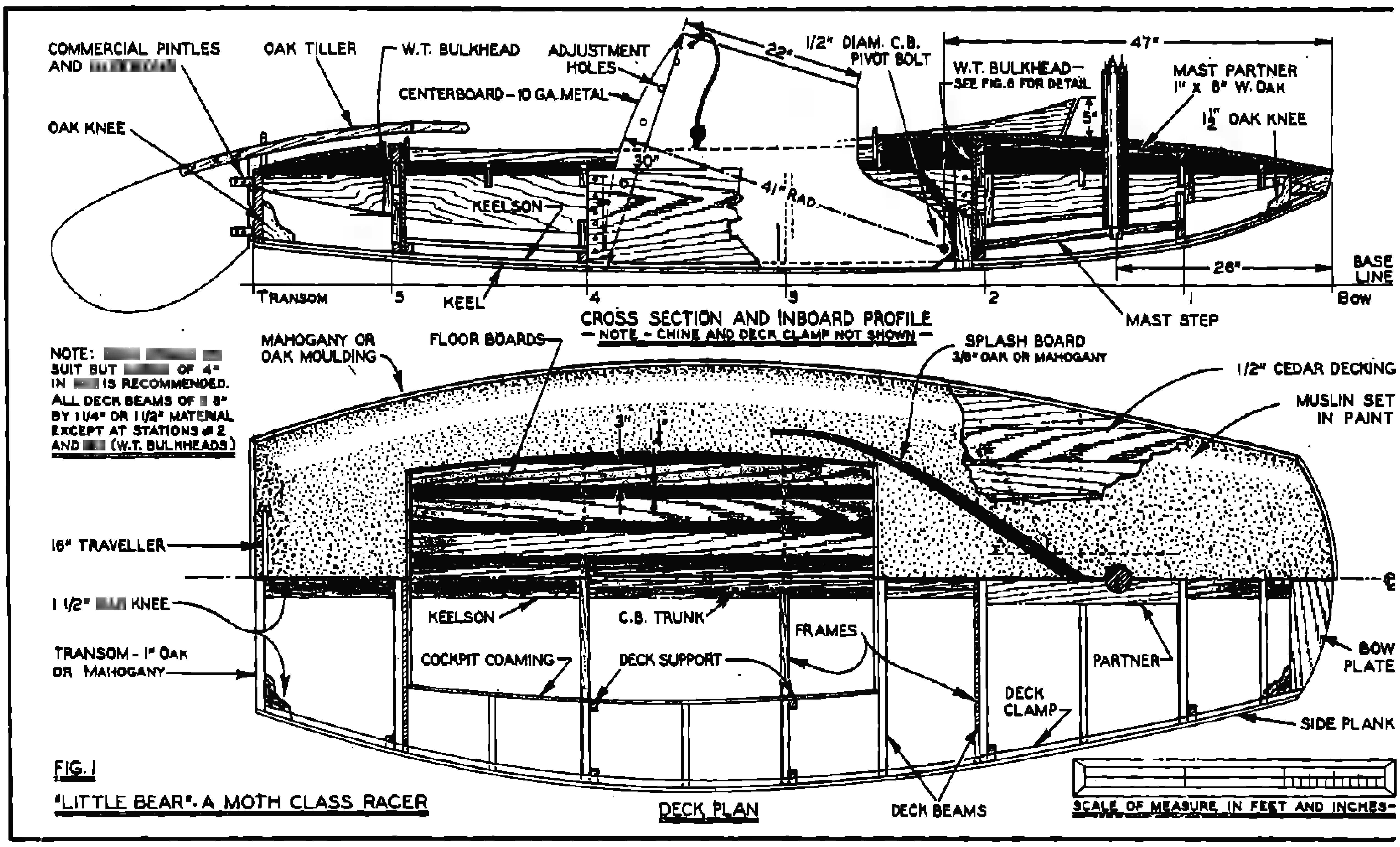

BOW PLATE
1
CENTER SHEER TO SUIT
2
3
10'-10"
4
SHEER LINE PARALLEL TO BASE LINE
5
TRANSOM
24"
2" SQUARES
3¼"
14"
10¾"
12¼"
½"
LINES PROFILE
OUTSIDE CORNER CHINE LINE
RUDDER
BASE LINE
KEEL LINE
18"
24"
24"
24"
23½"
16½"
OUTSIDE CORNER CHINE LINE
SHEER
COAMING LINE
SCALE IN INCHES
4½"
14⅝"
14¼"
WATERTIGHT BULKHEAD
HALF-BREADTH LINES PLAN
WATERTIGHT BULKHEAD
16½"
CENTER LINE
17¾"
22¾"
25⅝"
25⅜"
21¼"
16½"
2⅝"
STATION NO. 1
STATION NO. 2
STATION NO. 3
STATION NO. 4
STATION NO. 5
TRANSOM
14"
4⅝"
9⅞"
4⅝"
17¼"
7⅜"
2"
6⅜"
22¼"
8⅜"
1⅞"
5⅞"
24⅞"
8¼"
1⅞"
5¾"
24⅝"
6"
3"
8"
20¾"
11⅝"
4⅝"
16¼"
BASE LINE
HALF-BREADTH CROSS-SECTIONS OF TRANSOM AND FRAME STATIONS

Fig. 3, above right, is a general view of the completed Moth and rigging. Inset shows the details of mast head. In Fig. 2 note that station dimensions are to outside of planking. See Fig. 4 for construction. Cut rudder to shape shown above. After studying above drawings, lay out plans full size with a 12' batten. Full size plans supersede any minor deviations.

Centerboard Adjustment Made When in Place


COMMERCIAL PINTLES AND [redacted]
OAK TILLER
W.T. BULKHEAD
ADJUSTMENT HOLES
CENTERBOARD - 10 GA. METAL
22"
1/2" DIAM. C.B. PIVOT BOLT
47"
W.T. BULKHEAD - SEE FIG. 6 FOR DETAIL
MAST PARTNER 1" x 8" W. OAK
1½" OAK KNEE
5"
OAK KNEE
30"
KEELSON
4½" RAD.
28"
BASE LINE
TRANSOM
5
KEEL
4
3
2
1
BOW
MAST STEP
CROSS SECTION AND INBOARD PROFILE
— NOTE - CHINE AND DECK CLAMP NOT SHOWN —
NOTE: [redacted] SUIT BUT [redacted] OF 4" IN [redacted] IS RECOMMENDED. ALL DECK BEAMS OF [redacted] 8" BY 1 1/4" OR 1 1/2" MATERIAL EXCEPT AT STATIONS # 2 AND [redacted] (W.T. BULKHEADS)
MAHOGANY OR OAK MOULDING
FLOOR BOARDS
SPLASH BOARD 3/8" OAK OR MAHOGANY
1/2" CEDAR DECKING
MUSLIN SET IN PAINT
3"
1½"
16" TRAVELLER
℄
1 1/2" [redacted] KNEE
TRANSOM - 1" OAK OR MAHOGANY
KEELSON
C.B. TRUNK
FRAMES
COCKPIT COAMING
DECK SUPPORT
DECK CLAMP
PARTNER
BOW PLATE
SIDE PLANK
DECK BEAMS
FIG. 1
"LITTLE BEAR"- A MOTH CLASS RACER
DECK PLAN
SCALE OF MEASURE IN FEET AND INCHES

Above—Note shape and dimensions of centerboard in the cross-section drawing. The centerboard trunk is fitted between stations [redacted] and 4. Watertight bulkheads [redacted] at stations [redacted] and 5. For the bottom planking, either ½-inch cedar, mahogany, or redwood may be used. The garboard strake (next [redacted] keel) must always be the first plank to be fitted.

redwood, ½″ thick. The garboard strake, or plank nearest the keel, is fitted first. Plane off the shoulder of the keel to conform to the frame sides and coat it with thick paint or marine glue. The batten is similarly treated. Then screw the garboard strake securely to the bow plate, to each of the frames and to the stern transom. Put some good screw fastenings along the edge of the keelson as well, and then use copper clinch nails or rivets, spaced about 2″ apart, to secure the plank to the seam batten.

The jig or former, may now be removed from the keel. Take out the screws and plug the holes tight. Then rip the centerboard slot. This slot should be ½″ wide and its size and location can be taken off the drawings, Fig. 1.

Fig. 9, in conjunction with the inboard profile drawing, Fig. 1, explains the simple construction and fitting of the centerboard trunk. The trunk is fastened to the keelson by 3″ brass screws *driven up through the keel. Do not drill the hole for the centerboard adjustment until later when you have the centerboard in place.* With the centerboard trunk in place the next step in order is to make the deck beams. These may be crowned, or rounded, to suit individual ideas but [redacted] four-inch in four feet curve is recommended. Make a master mould and saw or steam bend all the deck beams to this mould or jig, establishing the widths required from the positions shown in the deck plan. The deck beams themselves may be of ⅞″ by 1¼″ or 1½″ oak, or you may use a lighter material. The beams at the watertight stations however should be in all cases 1″x1½″ material as shown in Fig. 6.

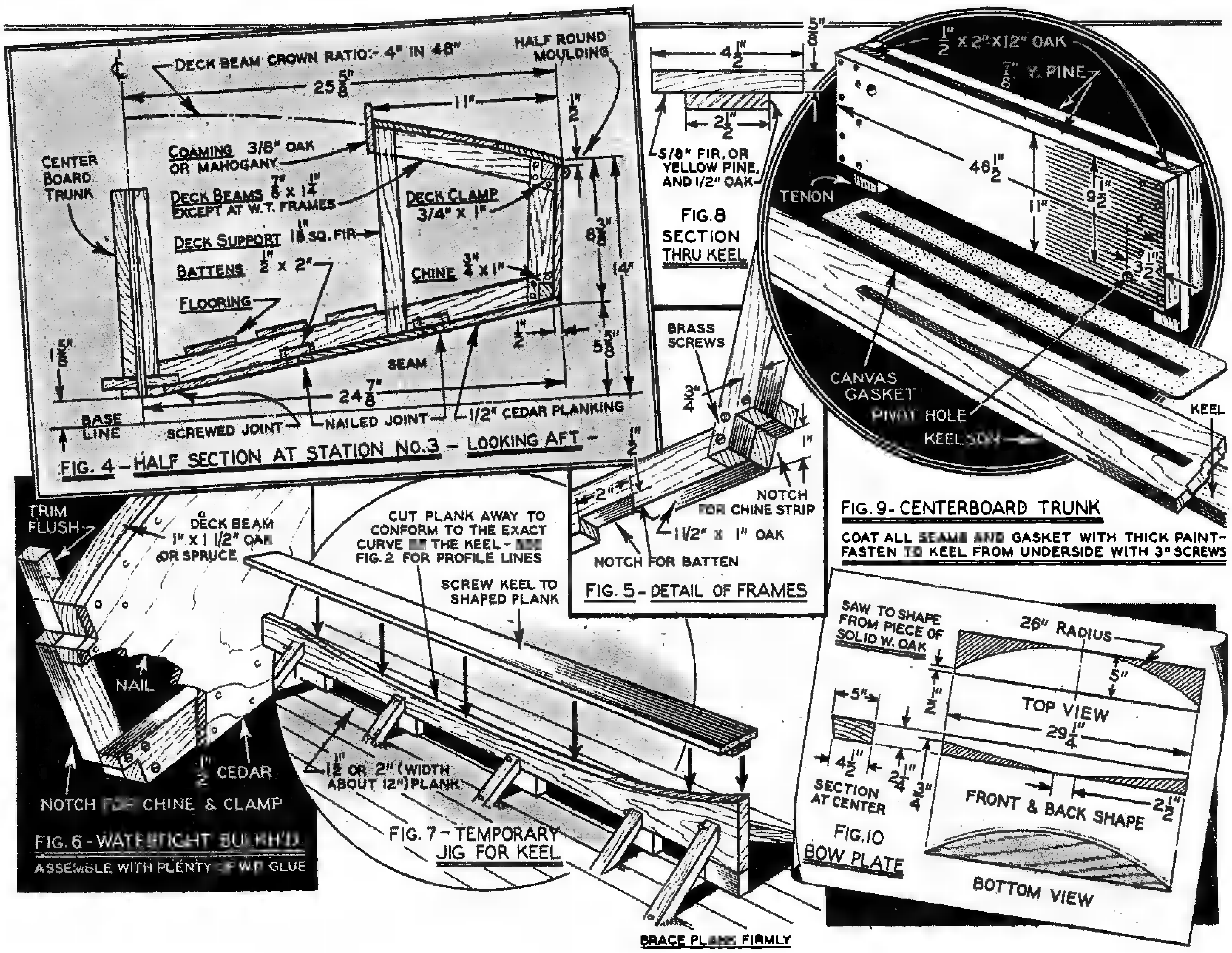
The deck beams are screwed in place at all frame stations and also where shown in the deck plan, Fig. 1.

Where the cockpit occurs, *put in full beams,* sawing out later after decking. One thing remains before laying the deck. This is the installation of the mast step and partner.

The decking, of ½″ cedar, is secured to the deck beams with well countersunk finishing nails. It is laid fore and aft—the same as the bottom planking—and you will find that four-inch planks [redacted] the best.

With the deck nailed down and the nail holes filled with white lead, plane and sand the entire deck down until it is perfectly smooth. Then cover with heavy paint or marine glue and stretch muslin smoothly over the entire surface, bringing the edges down over the side planks about one inch

Mast, Boom Must Not Exceed Three Inch Diameter


DECK BEAM CROWN RATIO:- 4" IN 48"
HALF ROUND MOULDING
25 5/8"
11"
1/2"
CENTER BOARD TRUNK
COAMING 3/8" OAK OR MAHOGANY
DECK BEAMS 7/8" x 1 1/4" EXCEPT AT W.T. FRAMES
DECK CLAMP 3/4" x 1"
DECK SUPPORT 1 1/8" SQ. FIR
BATTENS 1/2" x 2"
CHINE 3/4" x 1"
FLOORING
8 3/8"
14"
1 5/8"
SEAM
5 5/8"
24 7/8"
BASE LINE
SCREWED JOINT
NAILED JOINT
1/2" CEDAR PLANKING
FIG. 4 - HALF SECTION AT STATION NO. 3 - LOOKING AFT -
4 1/2"
5/8"
2 1/2"
5/8" FIR, OR YELLOW PINE, AND 1/2" OAK
FIG. 8 SECTION THRU KEEL
BRASS SCREWS
3/4"
1"
2"
NOTCH FOR CHINE STRIP
1 1/2" x 1" OAK
NOTCH FOR BATTEN
FIG. 5 - DETAIL OF FRAMES
1/2" x 2" x 12" OAK
7/8" Y. PINE
46 1/2"
TENON
11"
9 1/2"
3 1/2"
CANVAS GASKET
PIVOT HOLE
KEELSON
KEEL
FIG. 9 - CENTERBOARD TRUNK
COAT ALL SEAMS AND GASKET WITH THICK PAINT - FASTEN TO KEEL FROM UNDERSIDE WITH 3" SCREWS
TRIM FLUSH
DECK BEAM 1" x 1 1/2" OAK OR SPRUCE
NAIL
1/2" CEDAR
NOTCH FOR CHINE & CLAMP
FIG. 6 - WATERTIGHT BULKH'D
ASSEMBLE WITH PLENTY OF W.P. GLUE
CUT PLANK AWAY TO CONFORM TO THE EXACT CURVE OF THE KEEL - SEE FIG. 2 FOR PROFILE LINES
SCREW KEEL TO SHAPED PLANK
1 1/2" OR 2" (WIDTH ABOUT 12") PLANK
FIG. 7 - TEMPORARY JIG FOR KEEL
BRACE PLANK FIRMLY
SAW TO SHAPE FROM PIECE OF SOLID W. OAK
26" RADIUS
5"
TOP VIEW
29 1/4"
5"
1/2"
4 1/2"
2 1/2"
3/4"
SECTION AT CENTER
FRONT & BACK SHAPE
2 1/2"
FIG. 10 BOW PLATE
BOTTOM VIEW

Figures 4 to 10 show some of the finer details of construction. In laying the keel (Fig. 7) the member is firmly screwed into the mould of the cut-out plank to be released after the frame is built up to a point where it will hold in shape.

before tacking muslin down permanently. At this stage the hull should be painted with a good coat of white lead and oil.

The rudder explained in the drawings may be either of one-inch oak or 10-gauge metal. The spars are planed round with a uniform dimension. The "Moth" class boat does not permit mast or boom to exceed 3" in diameter. Actually a 3" diameter mast and a 2" boom will be found to achieve average requirements. A 5/8" sail track is put along top of the boom and on the after side of mast.

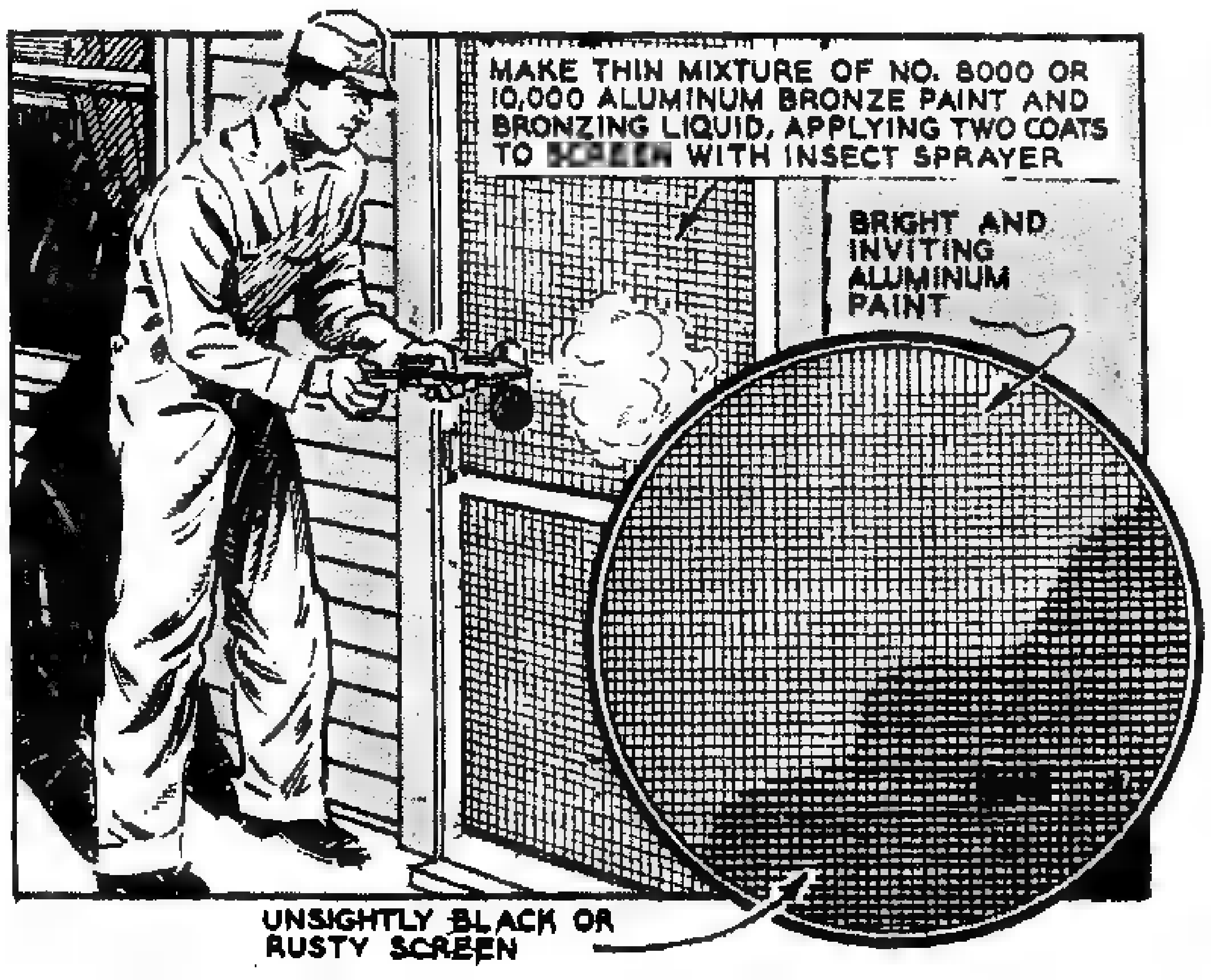
The sail shown in the drawings, Fig. 3, is the largest permitted in the class.

The metal fittings are few and simple. It is recommended that all of them be obtained from commercial sources. The chain plates are attached to the side planks and to the prow. Five-inch turnbuckles are large enough for the standing rigging which is regular 1/8" stranded galvanized cable. The running rigging is of 3/8" manila. The peak halyard, is run through the sheave shown in the detail sketch on Fig. 5 to a check block on the mast. A traveler is needed for the sheet as also one or two small blocks. The flooring, which is of 1/2" cypress, is laid lengthwise as shown.

The cockpit coaming should be 3/8" mahogany or oak; splash boards are of the same material. The final touch is to put on the moulding which is half round mahogany or oak and is laid along the edge of the deck covering the tacks which hold the muslin covering.

OTHER BOAT PLANS AND PROJECTS
Plans for building 20 kinds of water craft from rowboats to motor cruisers are fully described in the new HOW TO BUILD 20 BOATS book, available at 50c, postpaid. More than 35 boats are described in MM's free blueprint catalog. Blueprints of LITTLE BEAR greatly enlarged and printed on durable blueprint paper can be secured at $1.50 per set. Order from: Modern Mechanix Publishing Co., Greenwich, Conn.

PREPARING THE HOME FOR SPRING


MAKE THIN MIXTURE OF NO. 8000 OR 10,000 ALUMINUM BRONZE PAINT AND BRONZING LIQUID, APPLYING TWO COATS TO SCREEN WITH INSECT SPRAYER
BRIGHT AND INVITING ALUMINUM PAINT
UNSIGHTLY BLACK OR RUSTY SCREEN

Spray Increases Life of Screens

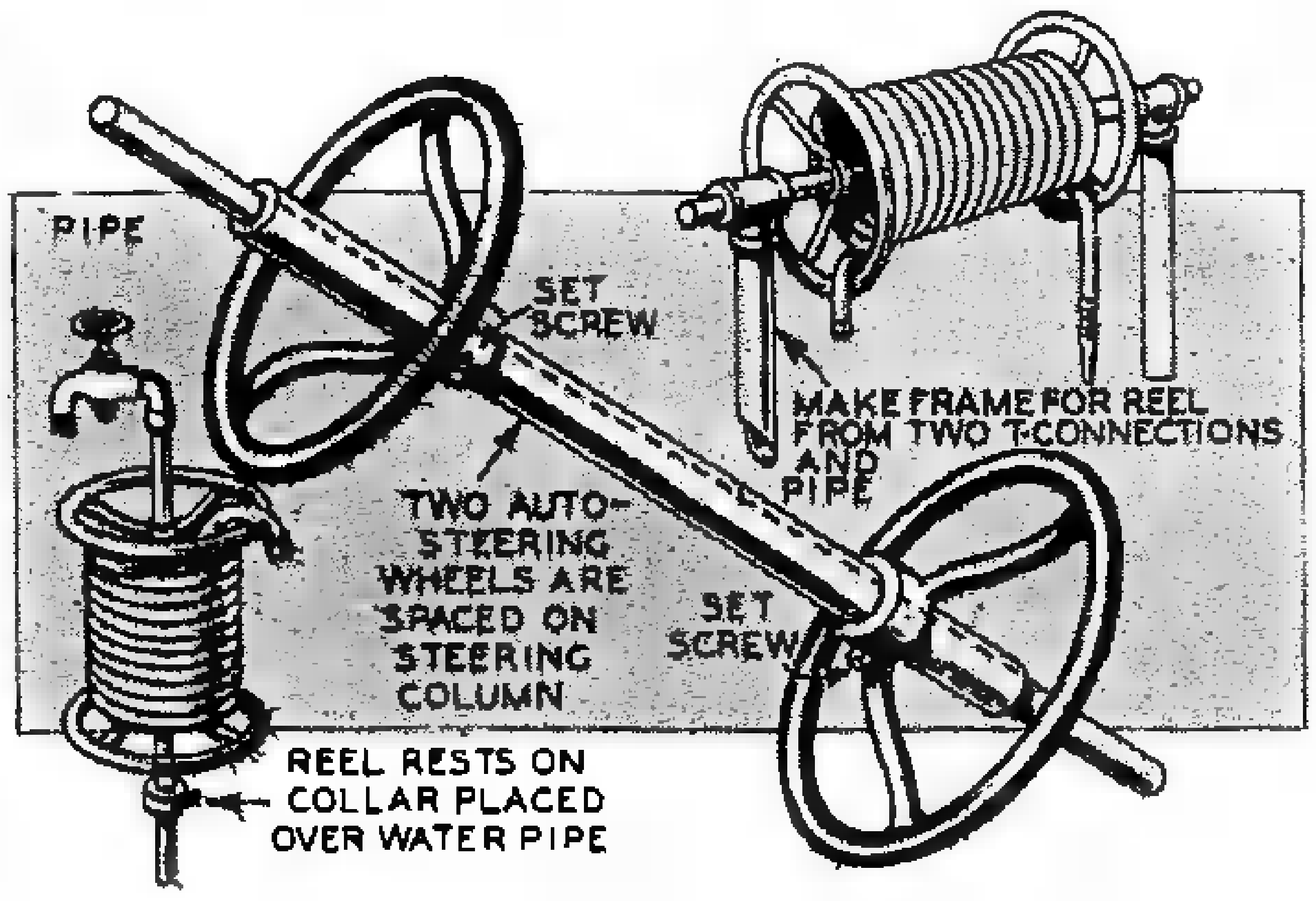
SCREEN doors and windows may be prepared for summer use by applying one or two coats of aluminum bronze to the screening using an insect sprayer or paint gun. Mix No. 8,000 or No. 10,000 aluminum bronzing powder with a sufficient amount of bronzing liquid so that it will pass through the sprayer. Apply an even coat to both sides of the screening and when dry follow with a second coat.

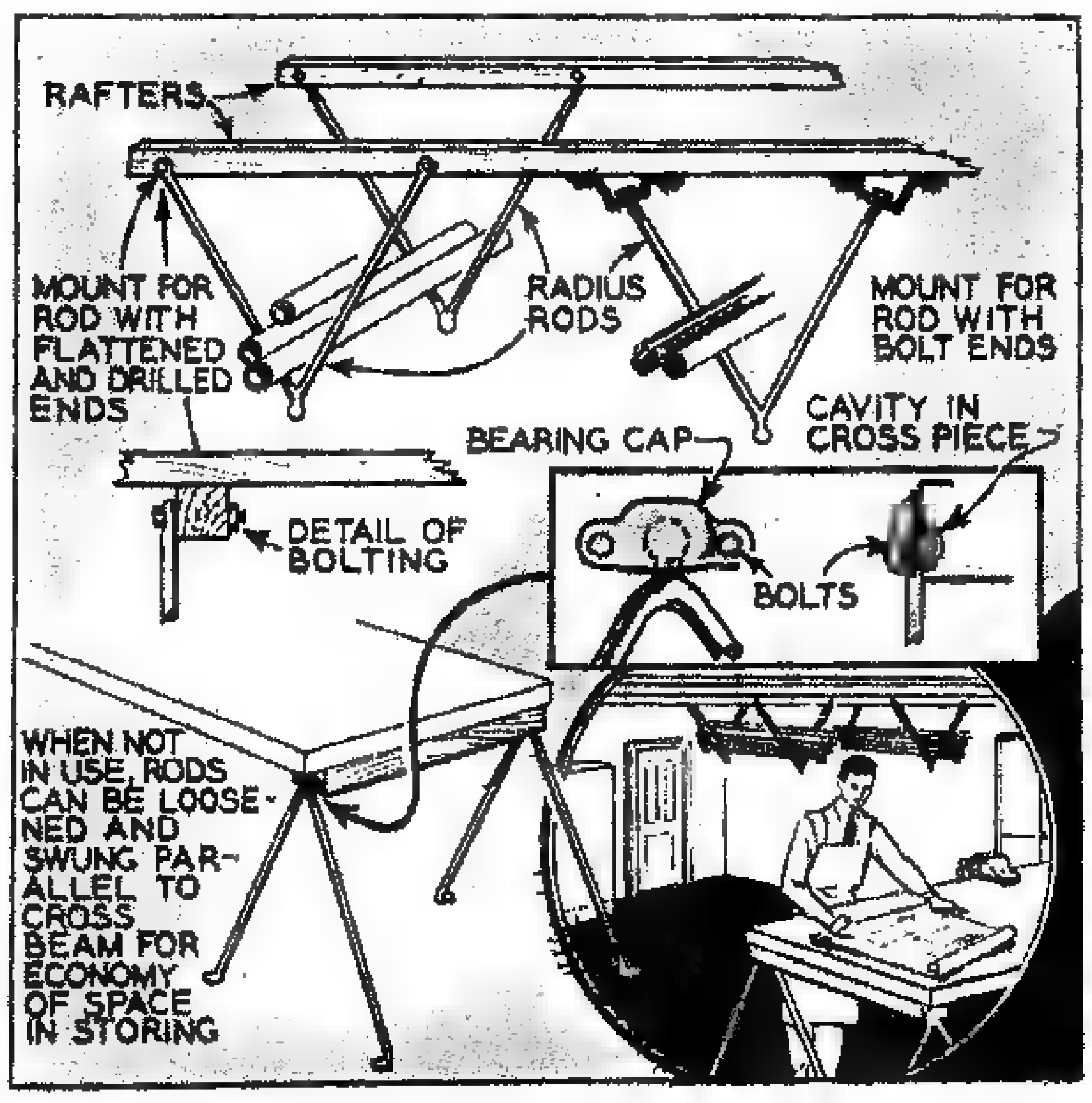
Screens finished in this manner will not rust and will, of course, have a much longer life than those not treated.—Oley Ward.

Steering Wheels Make Garden Hose Reel

A PAIR of old automobile steering wheels and a length of iron pipe make an excellent hose reel for the garden. Mount the wheels on a length of the original steering post, clamping them in place by tightening the set screws.

Make the reel from the iron pipe to which has been attached a pair of tees. Anchor the other ends of the pipe in the ground. The reel may be mounted in a vertical position if desired.—A. Hoff.


PIPE
SET SCREW
MAKE FRAME FOR REEL FROM TWO T-CONNECTIONS AND PIPE
TWO AUTO-STEERING WHEELS ARE SPACED ON STEERING COLUMN
SET SCREW
REEL RESTS ON COLLAR PLACED OVER WATER PIPE


RAFTERS
MOUNT FOR ROD WITH FLATTENED AND DRILLED ENDS
RADIUS RODS
MOUNT FOR ROD WITH BOLT ENDS
CAVITY IN CROSS PIECE
BEARING CAP
DETAIL OF BOLTING
BOLTS
WHEN NOT IN USE, RODS CAN BE LOOSENED AND SWUNG PARALLEL TO CROSS BEAM FOR ECONOMY OF SPACE IN STORING

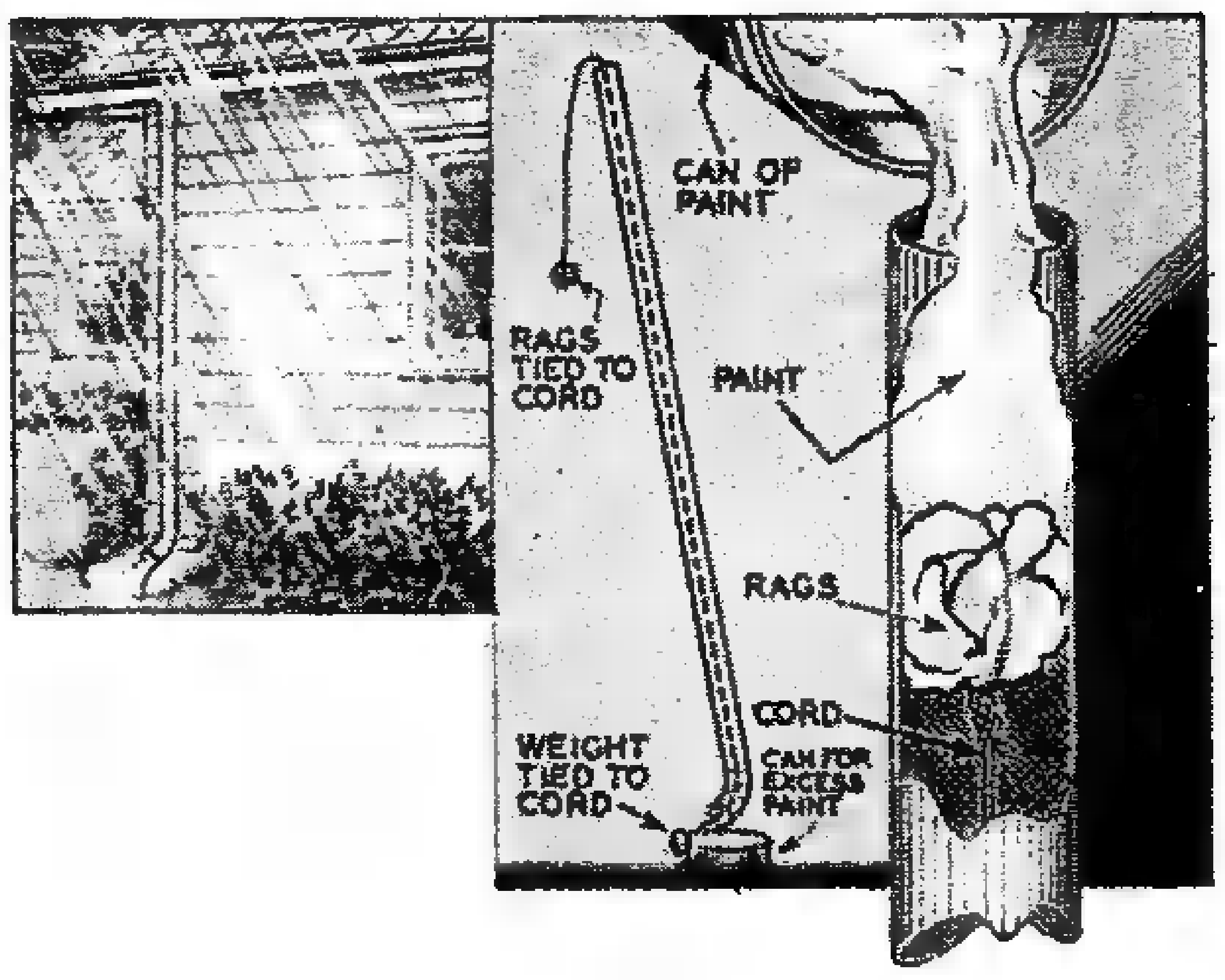
Storage Racks Made from Auto Radius Rods

TWO radius rods taken from old cars can be used around the home for a variety of purposes. Mounted in the ceiling of the garage or basement they make ideal racks for supporting pipe, lumber, ladders and numerous other articles. A feature of the racks is that they may be swung out of the way when not in use.

The radius rods can also be used for table or bench legs or even saw horses. Use a length of 2"x4" stock for cross members and at each end bore a shallow recess for the ball on the end of the rod. Attach bearing cap with screws and tighten until legs are rigid.—W. Wilhite.

Cloth Swab Paints Inside of Rain Spout

ALTHOUGH the outside surface of water spouts receive sufficient protection little attention is given to the inside of the pipe where it is really necessary. By painting both the inside and outside surfaces of the pipe its life will be nearly doubled. To paints the inside of the pipe secure a bunch of rags, a stout cord and a weight. Tie the rags up into a ball and attach to one end of the cord. Weight the other end and drop down spout. After pulling rags into pipe pour in paint then slowly pull cord until rags and paint pass through.—E. J. Novak.


CAN OF PAINT
RAGS TIED TO CORD
PAINT
RAGS
CORD
WEIGHT TIED TO CORD
CAN FOR EXCESS PAINT

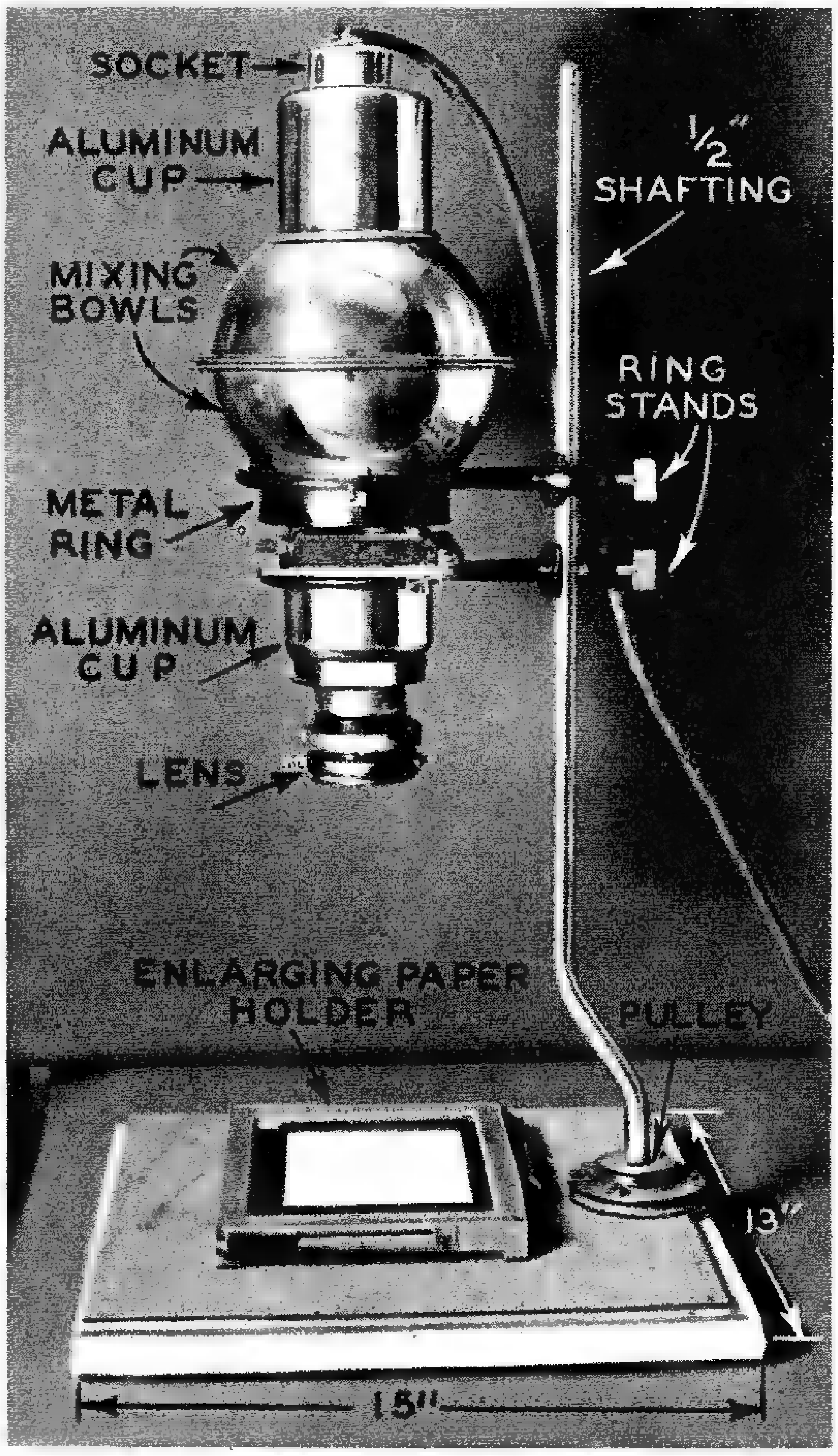
Kitchen Utensils Make Professional Photo Enlarger

THIS practical and very novel photo enlarger was constructed from readily obtainable parts yet has the appearance and does the work of a professional type instrument.

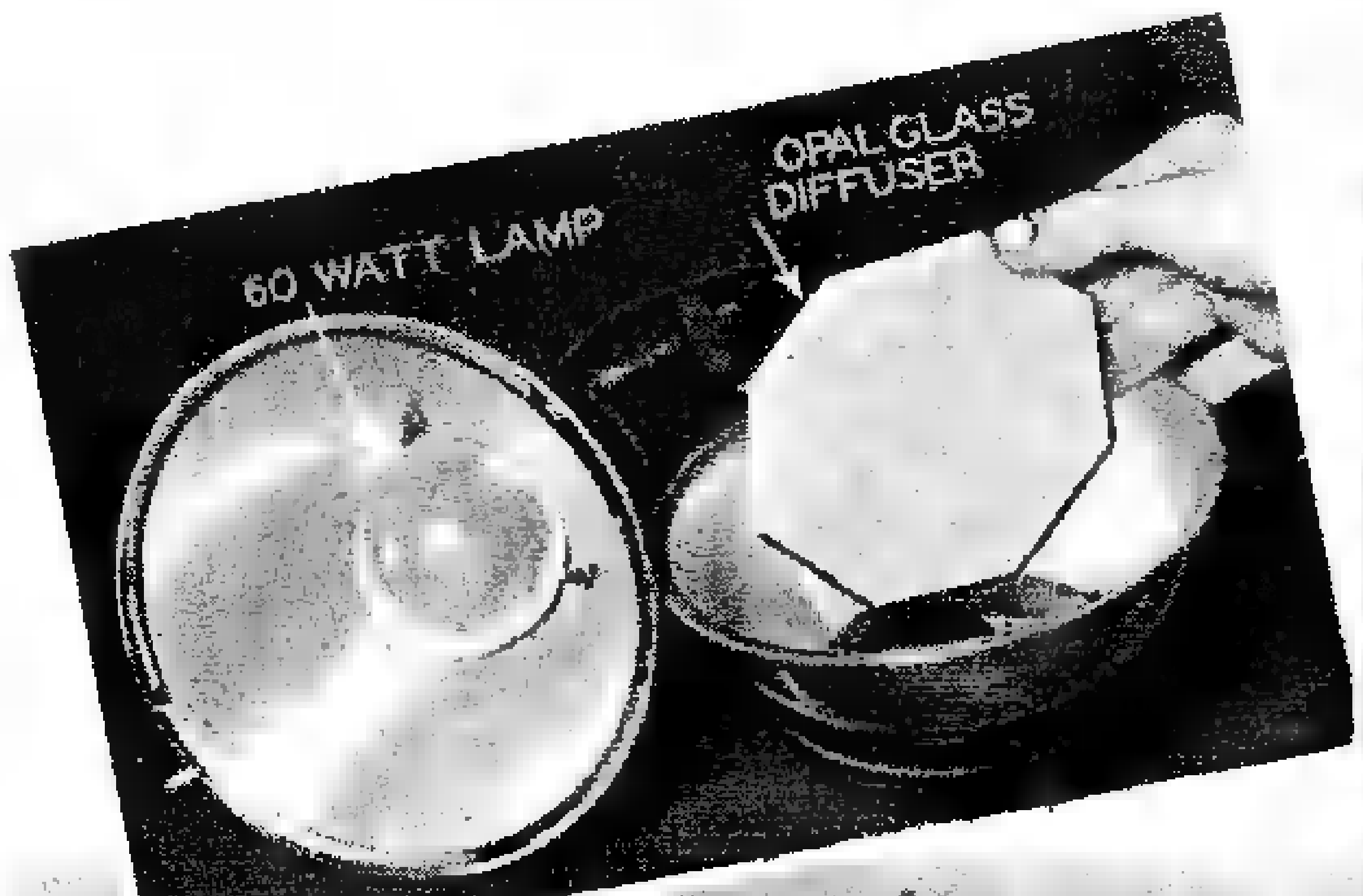
The base is made of wood, ¾"x13"x15". The focusing shaft is mounted along one of the long sides using a pulley to support it. The ½" shafting is bent from a 2 foot length into the shape shown.

The lamp housing consists of two aluminum mixing bowls about 7 inches in diameter, aluminum cup about 3 inches wide and the same depth and a porcelain ring socket. Cut a 3½-inch hole in one bowl and a 2¾-inch hole in the cup. Mount these together using machine screws. This unit contains the lamp socket and bulb. Next, cut a 3½-inch hole in the other bowl and around hole attach a 1-inch strip of tin, painted black. This ring is attached with small tin angles. Cut a piece of opal glass for a light diffuser and insert over hole. Screw a 60-watt bulb in socket and attach bowls together with bolts.

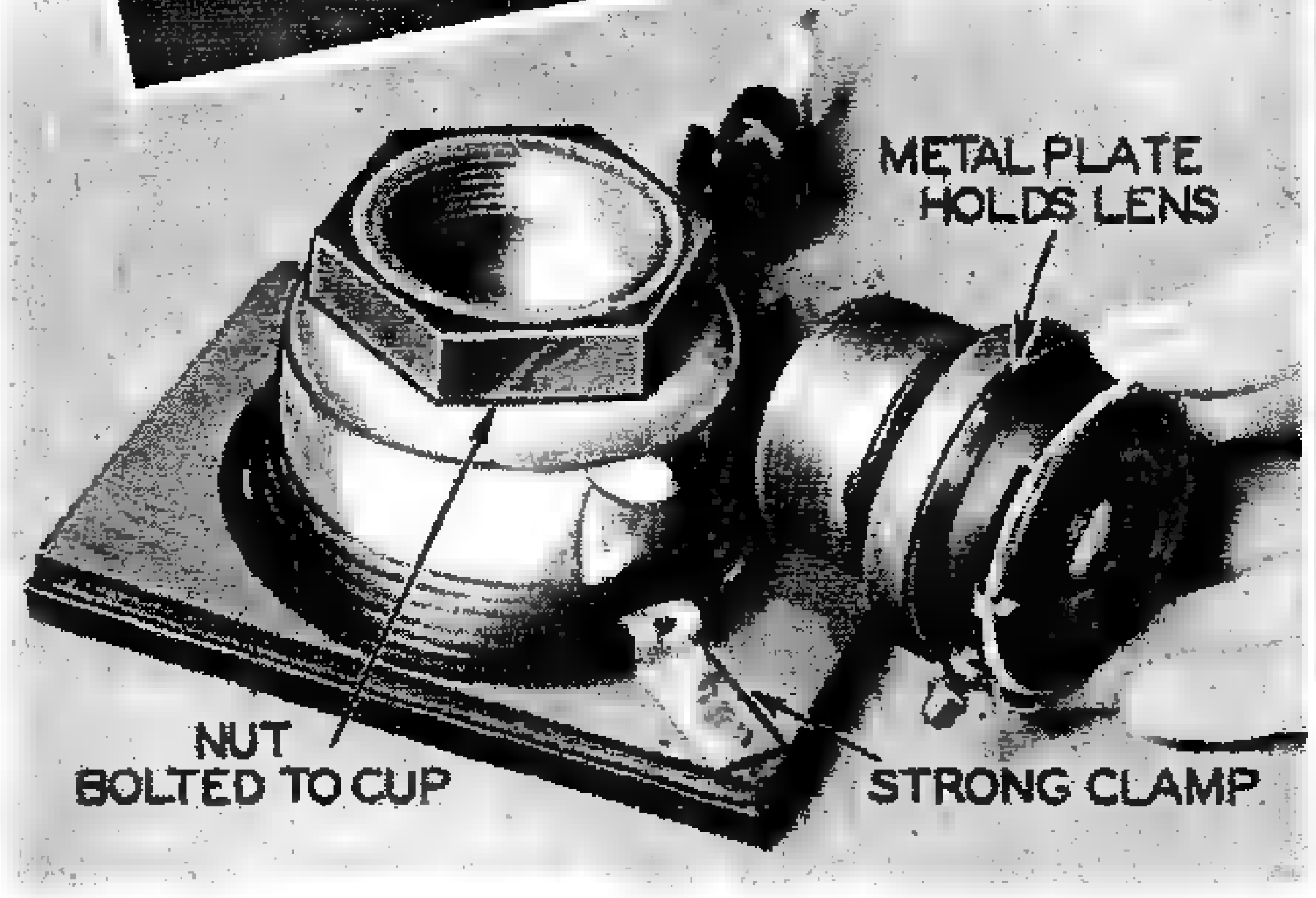
Make the holder for the lens from a 1½-inch black iron pipe nipple, 1½ inches long and provided with two lock nuts and attach to a cup similar to the one used in making the lamp housing. Cut cup down to about the size shown and fasten to the negative holder, in the 3-inch opening, with small brads. The negative holder is a simple wooden frame and slide made as shown. Use your regular camera lens by attaching to nipple with metal plate. A pair of laboratory ring stands are used to adjust the focus of the enlarger.


SOCKET
ALUMINUM CUP
MIXING BOWLS
METAL RING
ALUMINUM CUP
LENS
½" SHAFTING
RING STANDS
ENLARGING PAPER HOLDER
PULLEY
13"
15"

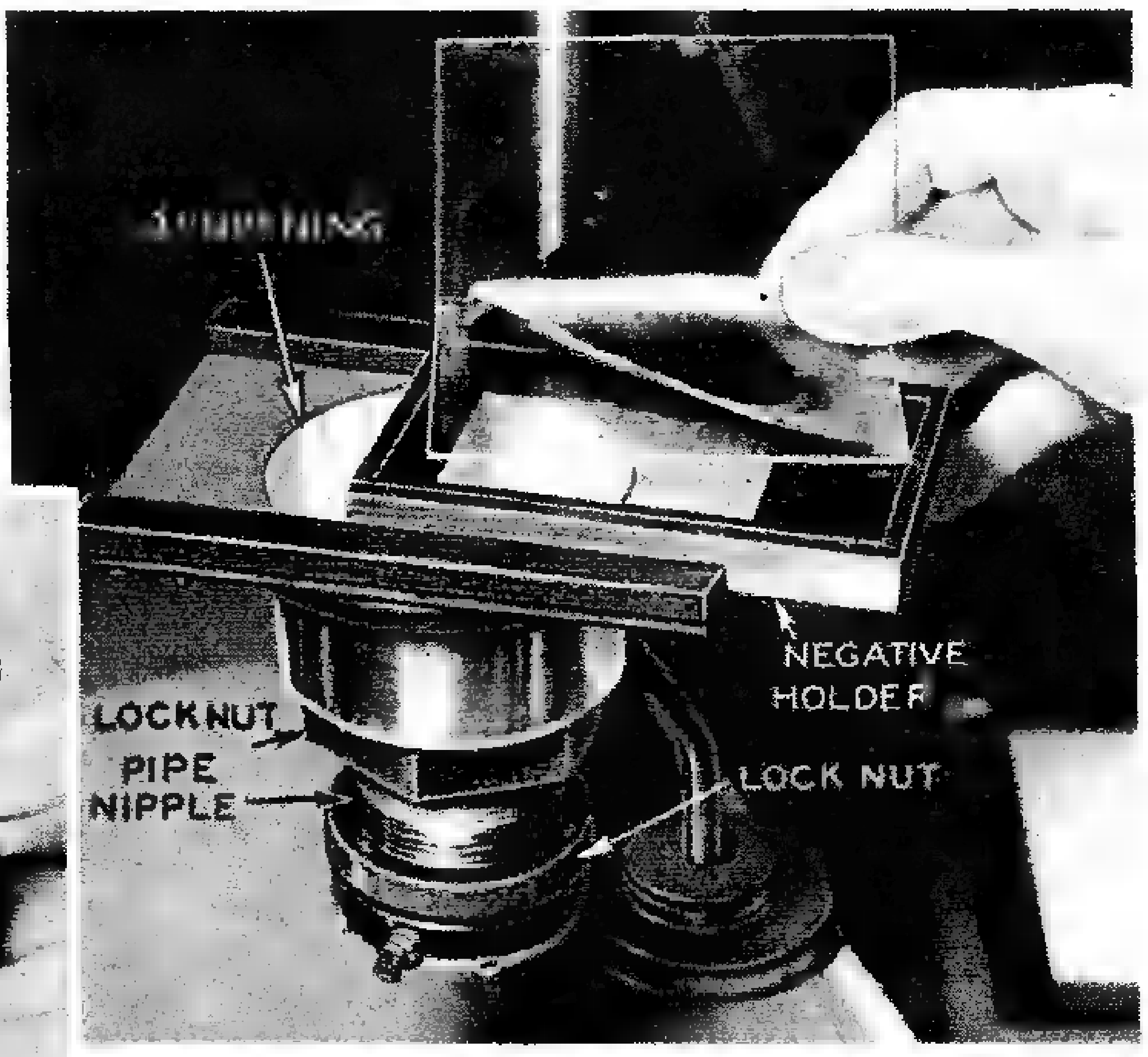
The completed photo enlarger does not appear to have been constructed from cooking utensils yet such is the case. Placement of all parts is clearly shown.


60 WATT LAMP
OPAL GLASS DIFFUSER

The completed lamp housing as it appears before bolting the two bowls together. The opal diffusing glass lays in bottom of the lower bowl.

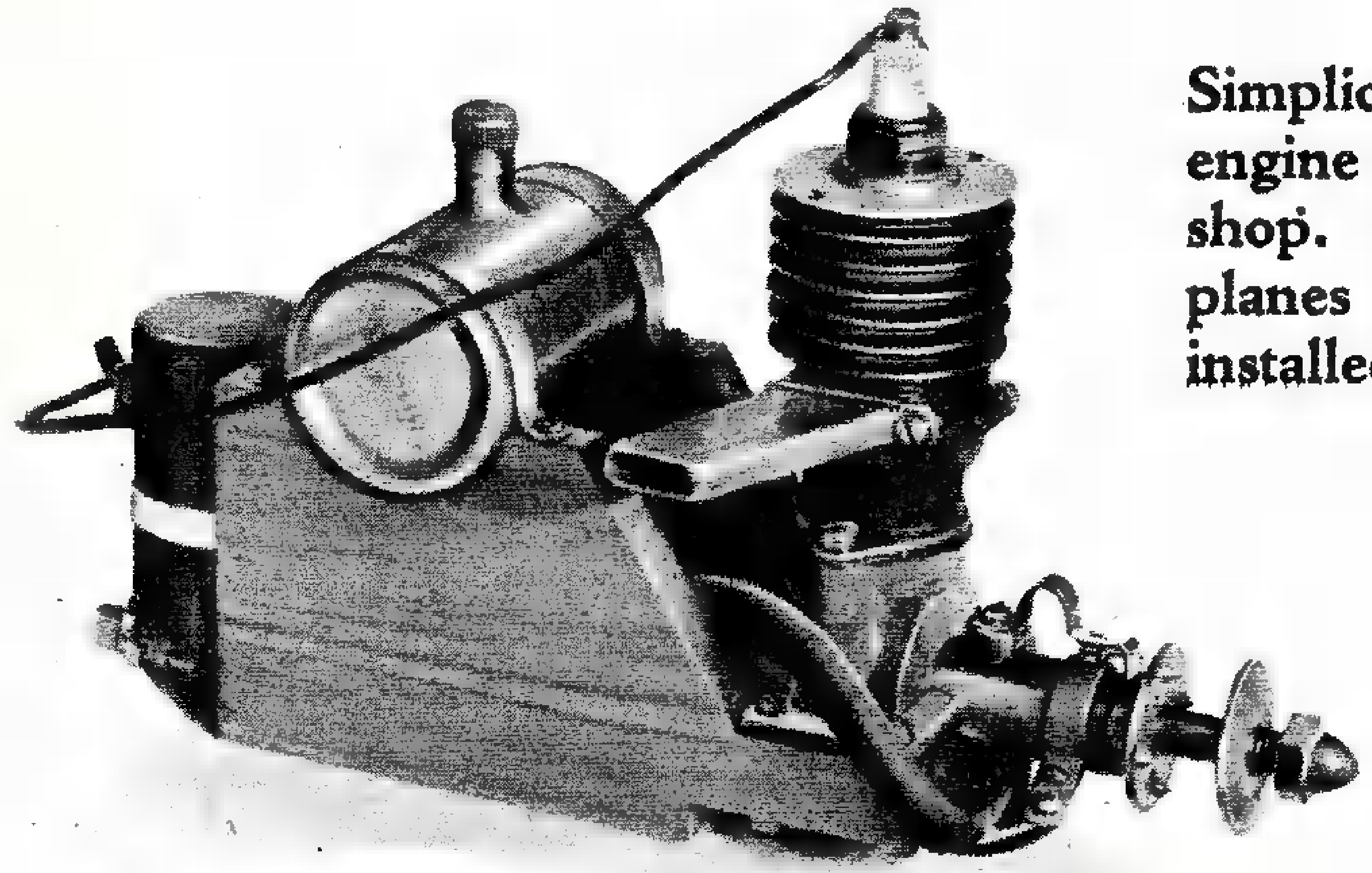

METAL PLATE HOLDS LENS
NUT BOLTED TO CUP
STRONG CLAMP

Details of the lens mounting is shown at right. Note the method of fastening lens to nipple and mounting of the aluminum cup in bottom of negative holder. Nipple permits vernier focus adjustment.


NEGATIVE HOLDER
LOCK NUT
PIPE NIPPLE
LOCK NUT

Details of the negative holder and lens mounting shown above. The small negative holder is made in the same manner as the regular printing frames.

"Chinook" A MIDGET GAS



This is *Chinook* completely assembled with gasoline tank and spark coil in place. Shaft is fitted to take a propeller 13 inches long on a model airplane.

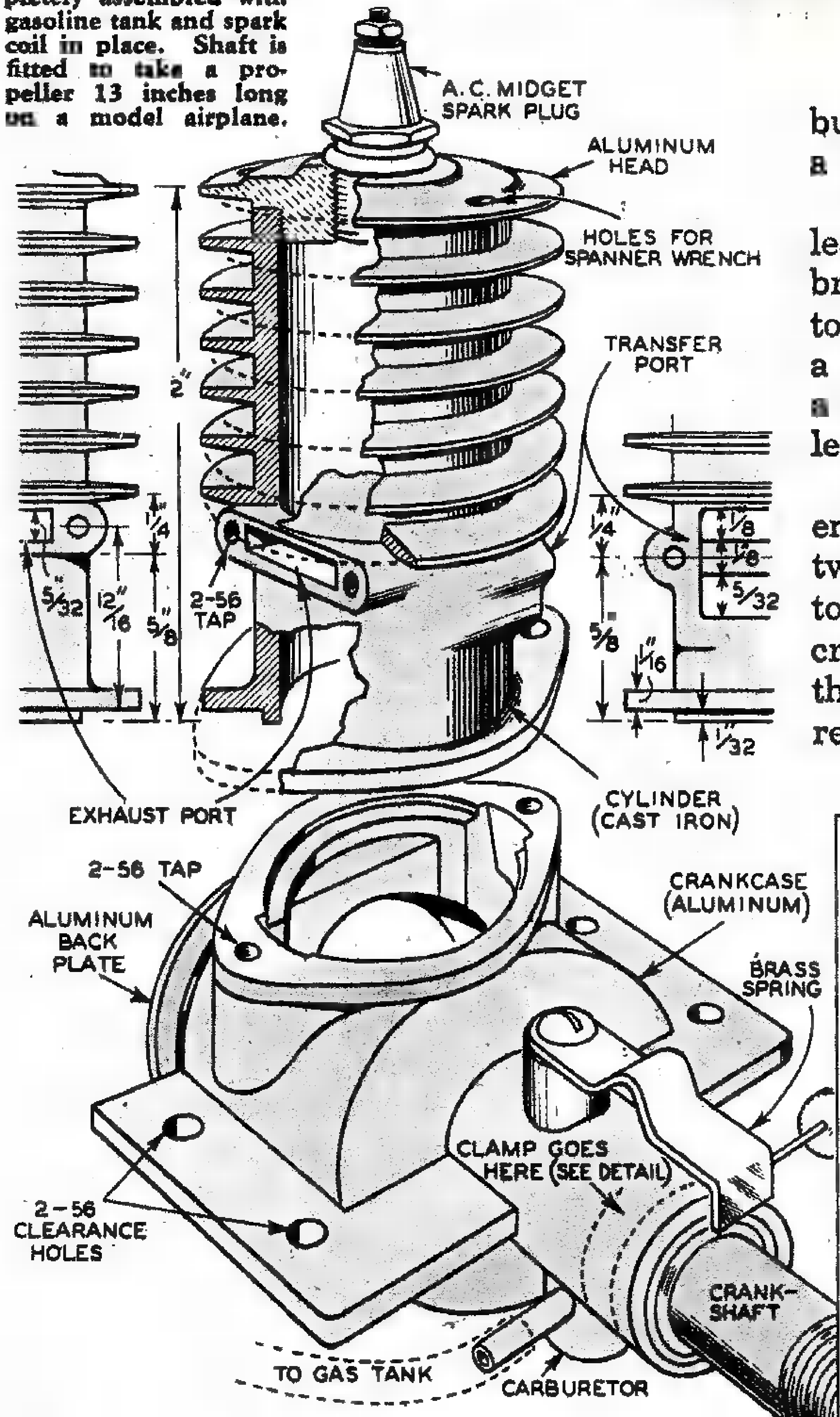
Simplicity of construction makes this engine an ideal project for the home shop. It can be used on four-foot model planes or with a water jacket can be installed easily in midget power boats.

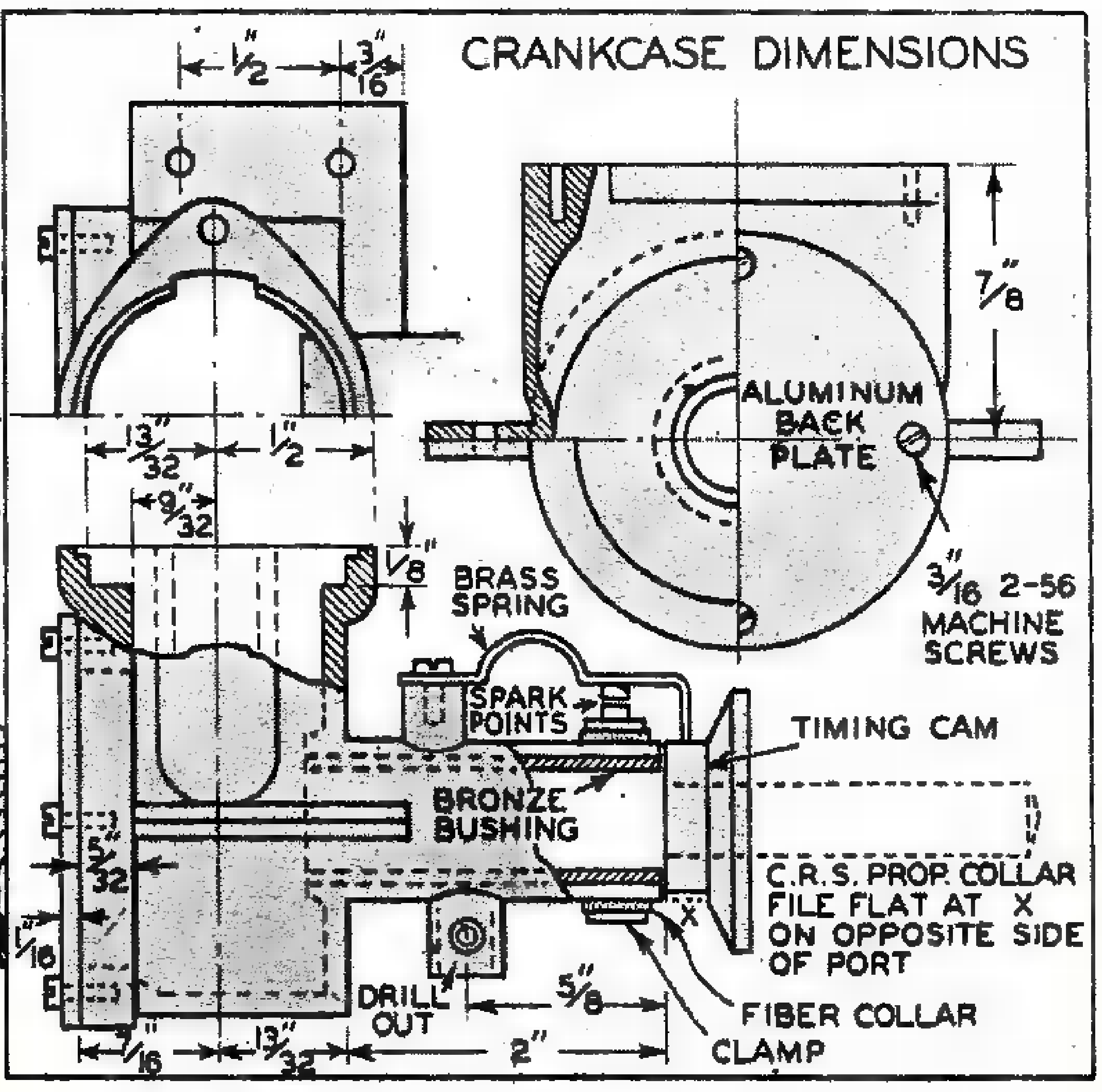
by WESTON FARMER

THE *Chinook* is so named for the hot dry winds that sweep across the middle west during the summer time. It will provide such a breeze for the running of any small 4′ model plane or enough power for a model boat. It can be built by anyone who has access to a lathe and a drill press.

It may also be built as a marine engine, by leaving off the cooling fins and pressing on a brass barrel between the top and bottom fins to serve as a water jacket. Provided thus with a three-inch flywheel, it will reliably power a small model boat of 24 to 30 inches overall length.

The operating principles of this little gas engine are explained in the sketches. It is a two-cycle engine. As the piston nears the top of the stroke, a vacuum is formed in the crankcase. This vacuum draws gas through the hollow crankshaft from the simple carburetor, or mixing valve, on the under side of


A.C. MIDGET SPARK PLUG
ALUMINUM HEAD
HOLES FOR SPANNER WRENCH
TRANSFER PORT
2"
1/4"
5/32"
12"/16
5/8"
2-56 TAP
1/8"
1/8"
5/32
1/4"
5/8"
1/16"
1/32
EXHAUST PORT
CYLINDER (CAST IRON)
2-56 TAP
ALUMINUM BACK PLATE
CRANKCASE (ALUMINUM)
BRASS SPRING
CLAMP GOES HERE (SEE DETAIL)
2-56 CLEARANCE HOLES
CRANK-SHAFT
TO GAS TANK
CARBURETOR

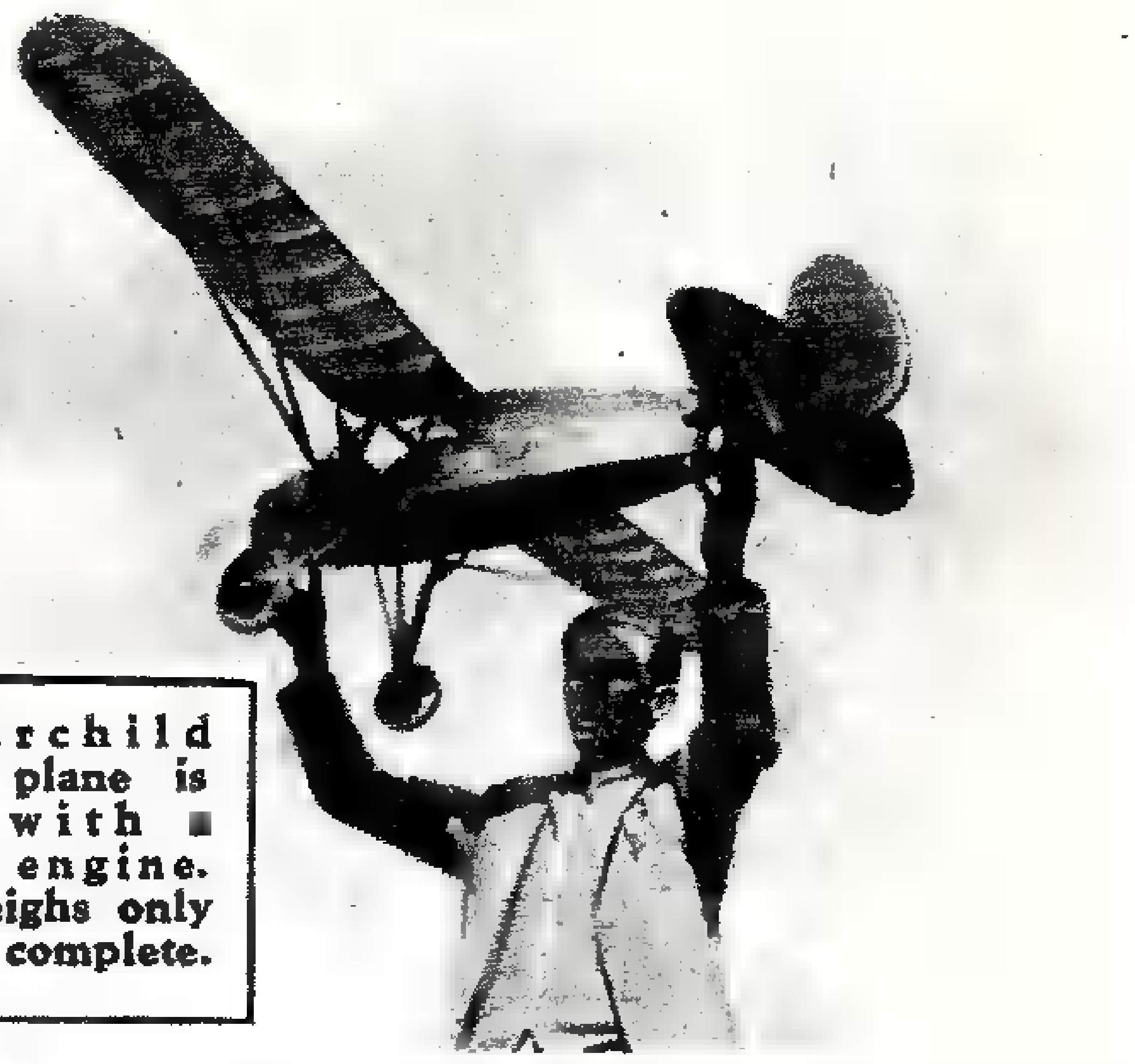

CRANKCASE DIMENSIONS
1/2"
3/16"
7/8"
ALUMINUM BACK PLATE
13/32"
1/2"
9/32"
1/8"
BRASS SPRING
3/16 2-56 MACHINE SCREWS
SPARK POINTS
TIMING CAM
BRONZE BUSHING
5/32
1/16"
C.R.S. PROP. COLLAR FILE FLAT AT X ON OPPOSITE SIDE OF PORT
X
DRILL OUT
5/8"
FIBER COLLAR
CLAMP
7/16"
13/32"
2"

Drawings above and at right show assembly and dimensions of crankcase and cylinder. Both are castings, but can be turned from solid by cutting various projections separately to shape and brazing whole together.

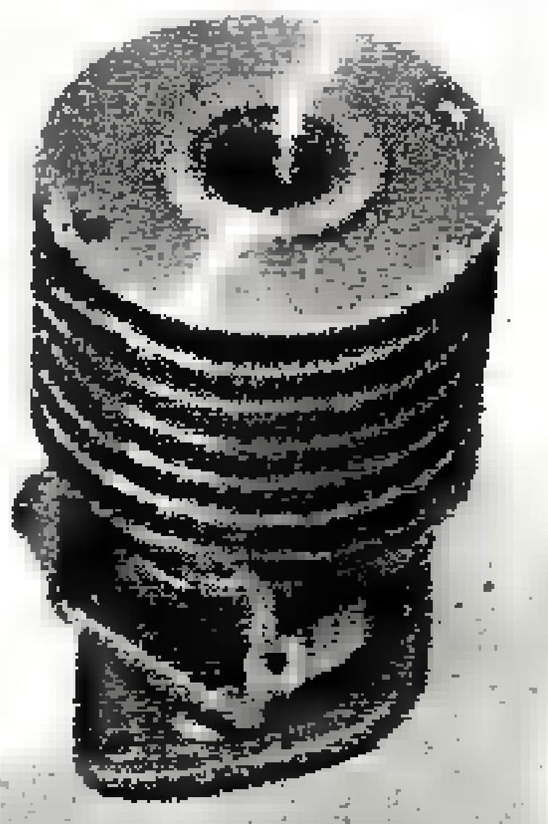
ENGINE FOR YOUR MODEL

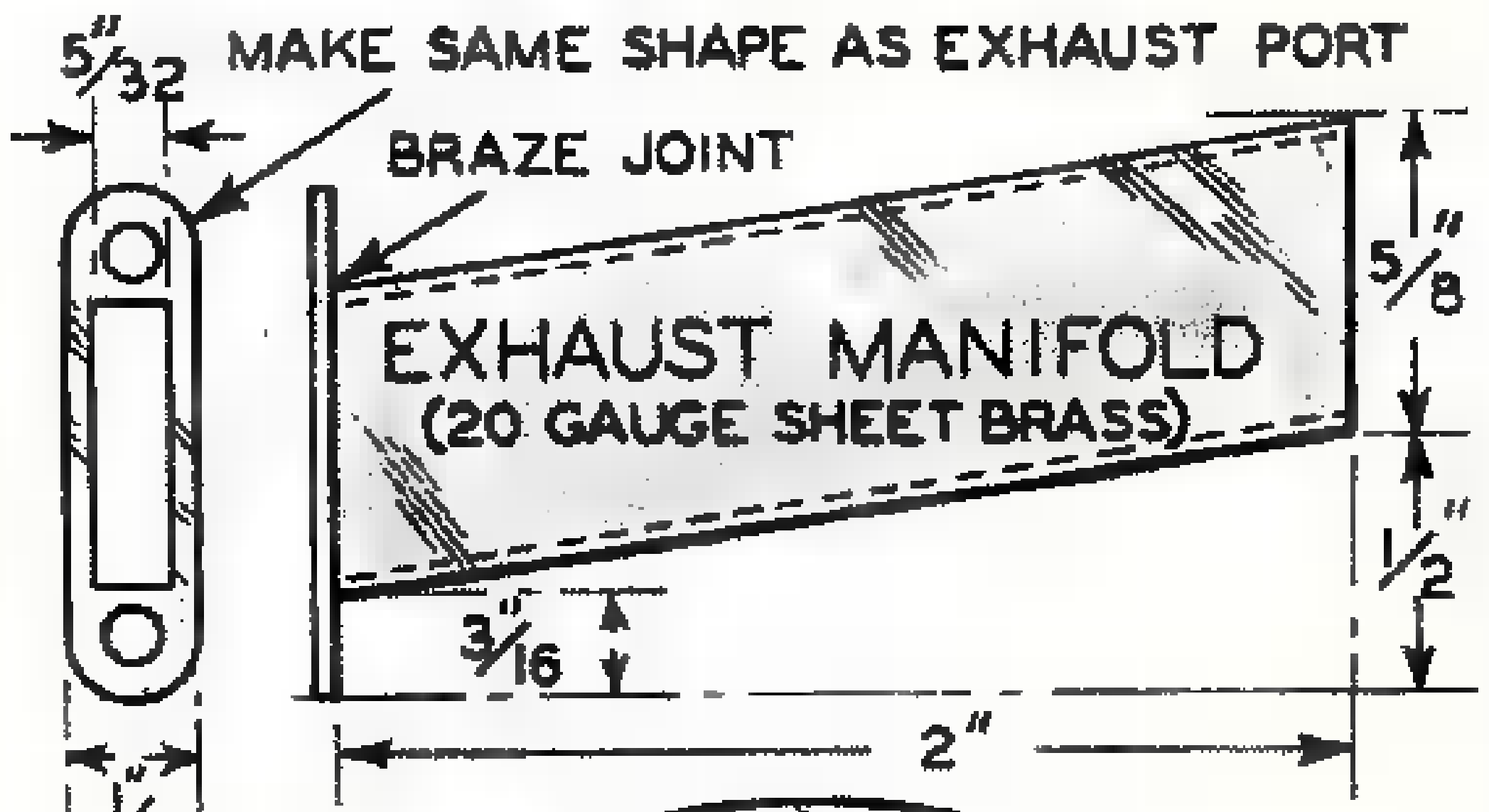
the shaft housing. The spark explosion sends the piston down. At the bottom of the stroke a transfer port on one side and the exhaust port on the other side of the cylinder are opened. The burnt gases escape, while the fresh gas in the crankcase is forced through a slot in the piston wall through the transfer port into the cylinder.

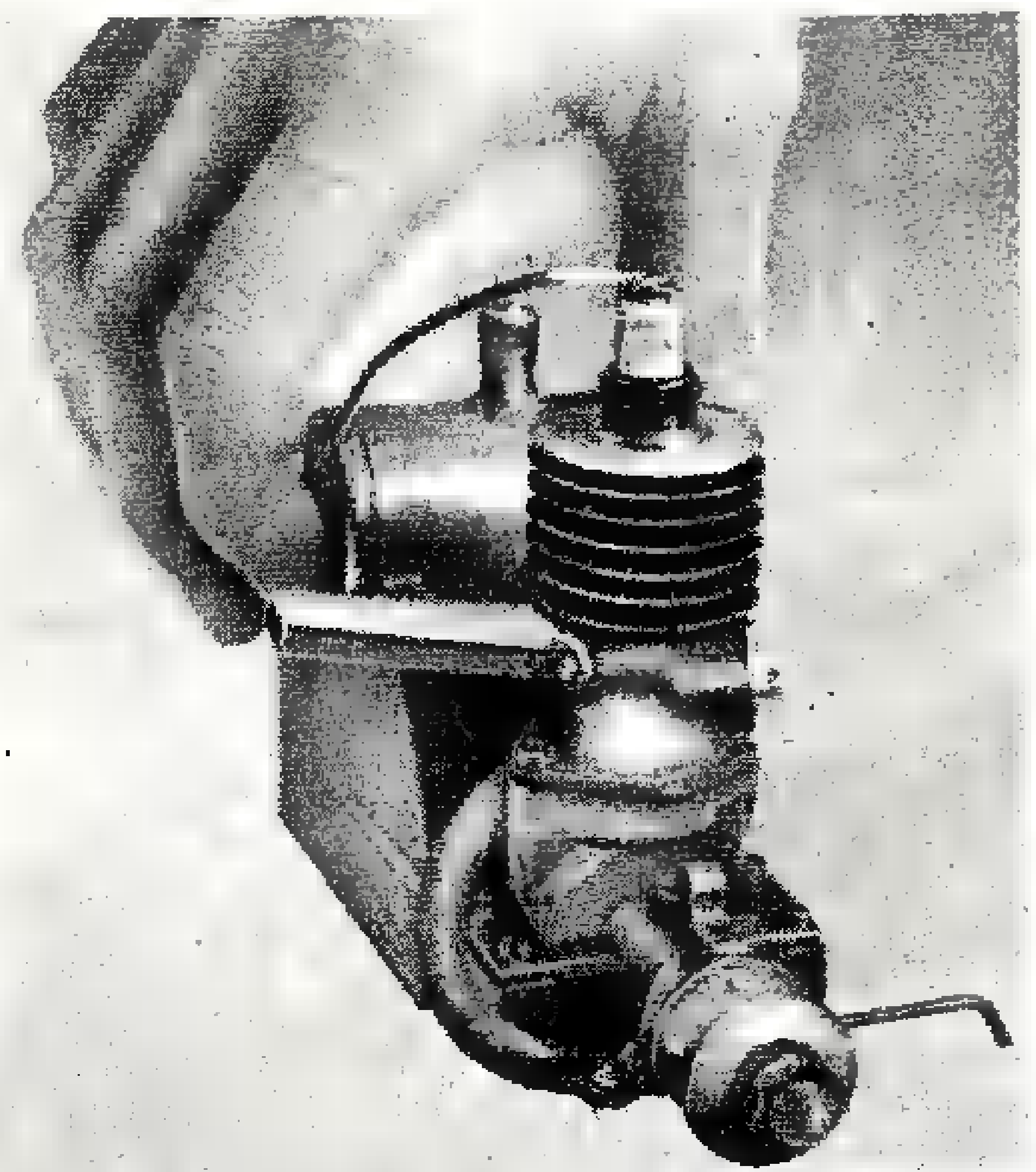
The crankcase on a two cycle engine is the most important part. In *Chinook*, the drawings show the proper dimensions for an aluminum crankcase which is intended to be cast. If you do not have a foundry handy, it can be turned and milled from the solid, with minor variations. In preparing the pattern for the casting do not bother with shrink rule. The pattern is too small to be affected by shrinkage. Make a split pattern, using generous core prints, and the result should be a smooth casting. Chuck the piece in the lathe, face off the rear end, then drill a 3/8″ hole through the bearing boss. Into this is pressed a drive fit

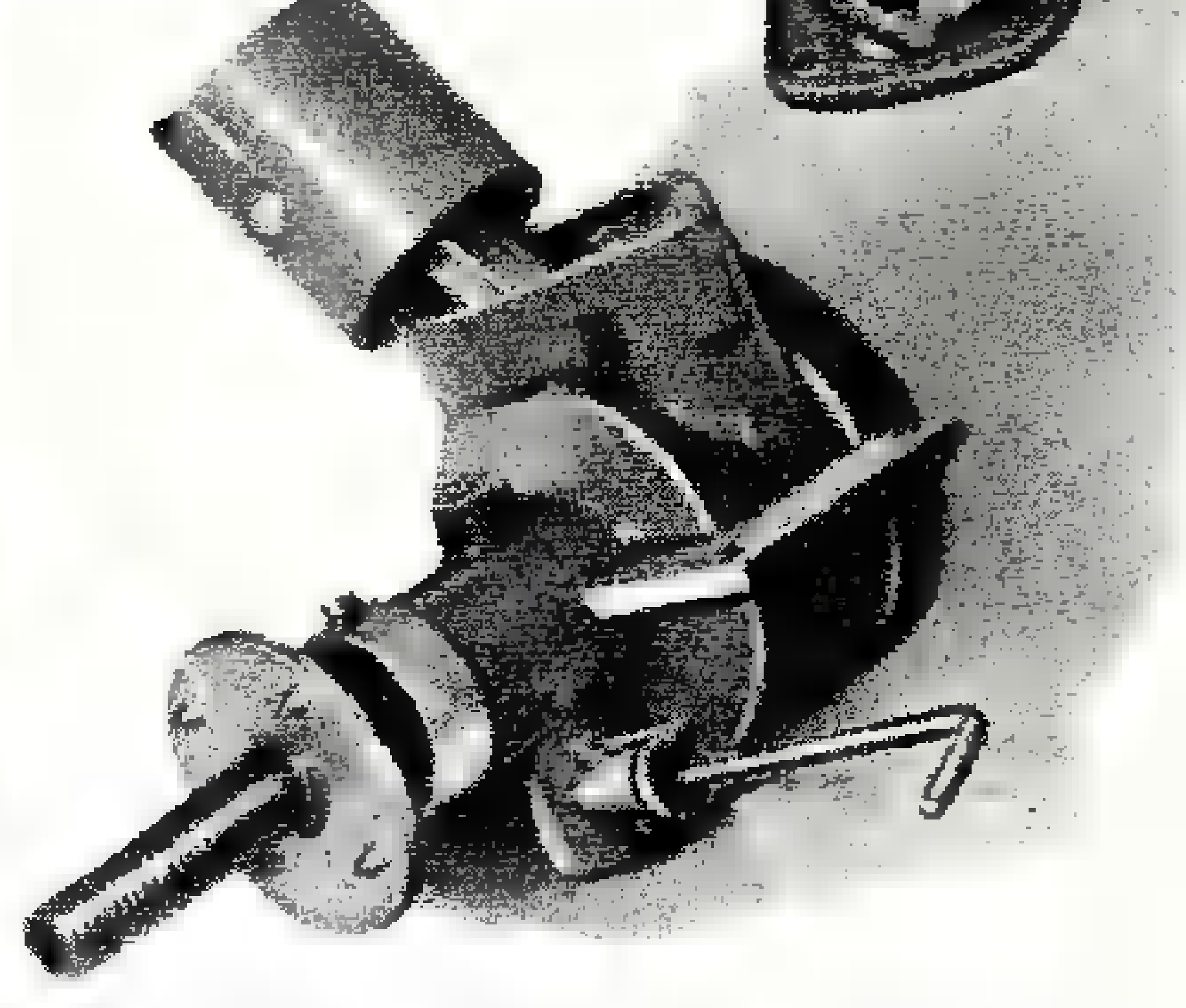


This Fairchild model plane is powered with a *Chinook* engine. Motor weighs only 12 oz. complete.

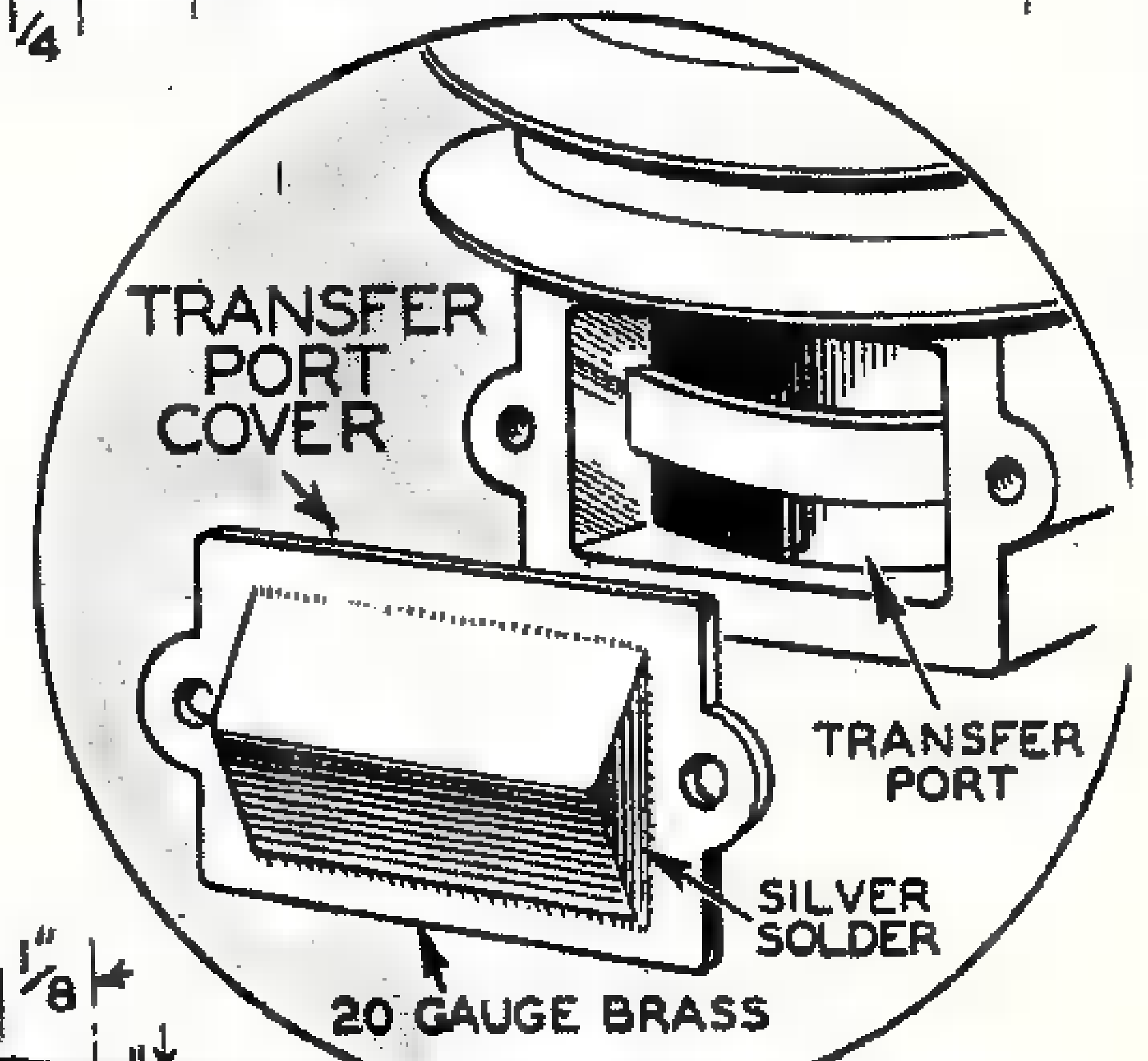



5/32
MAKE SAME SHAPE AS EXHAUST PORT
BRAZE JOINT
5/8"
EXHAUST MANIFOLD
(20 GAUGE SHEET BRASS)
1/2"
3/16
2"
1/4

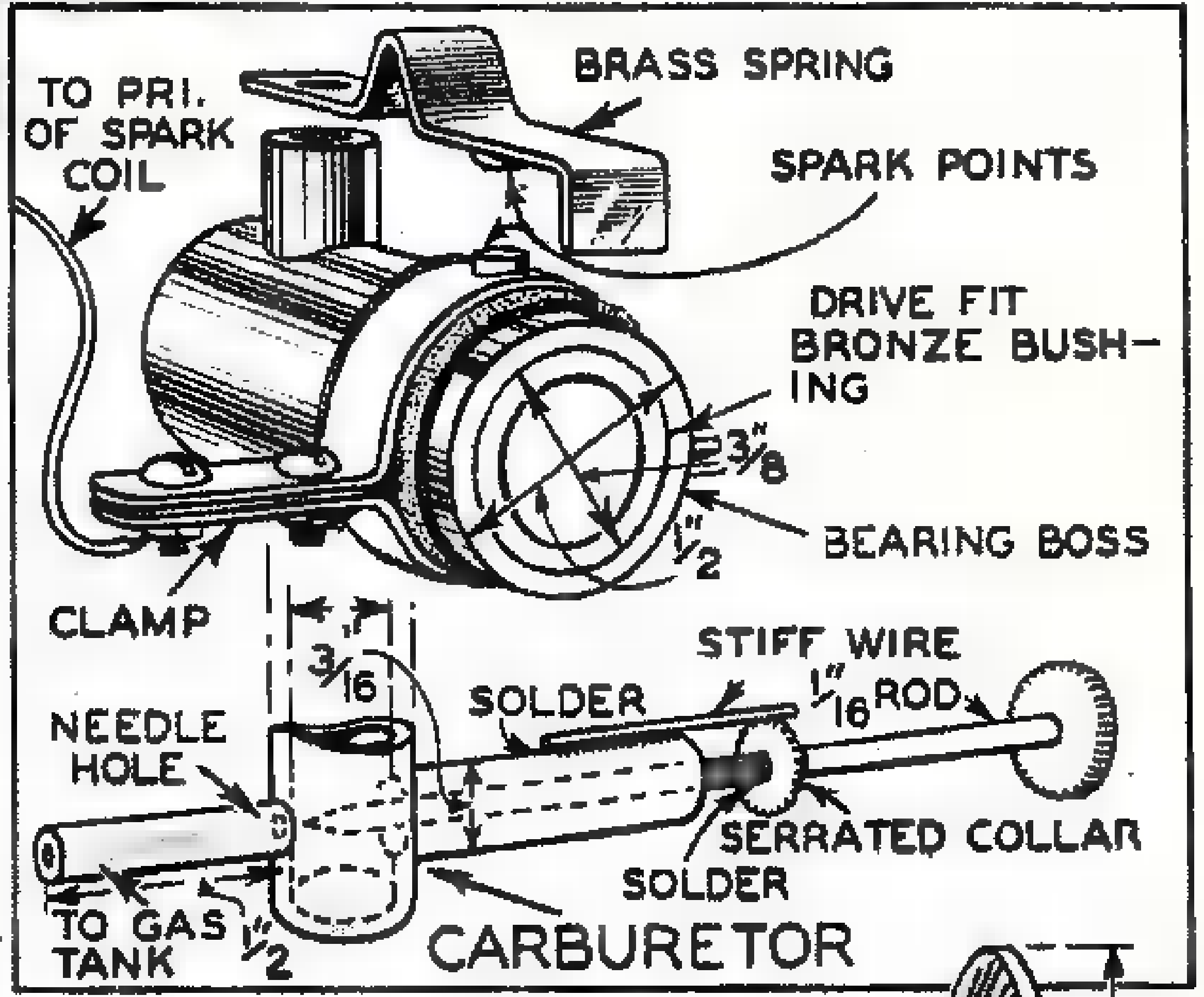


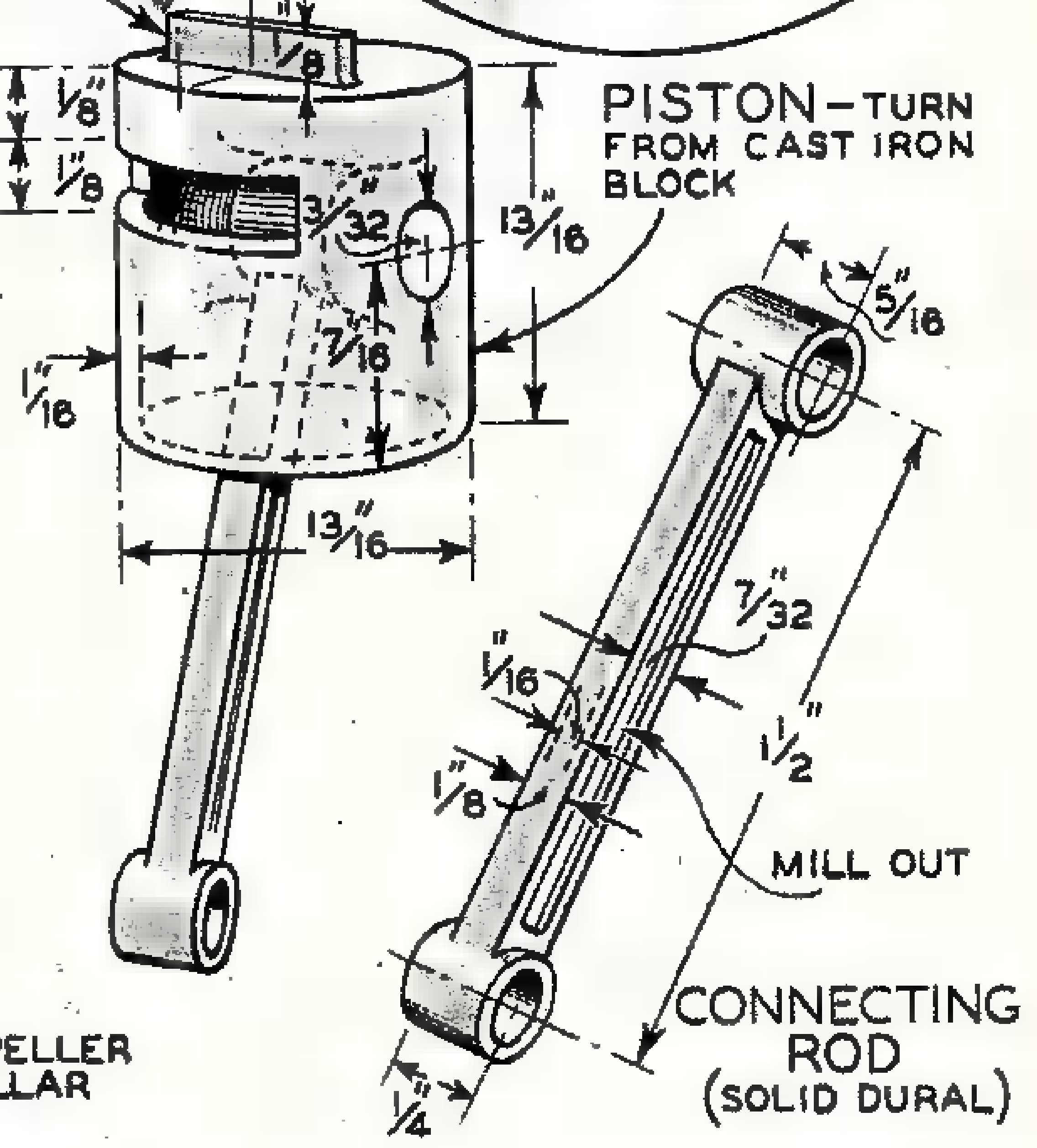


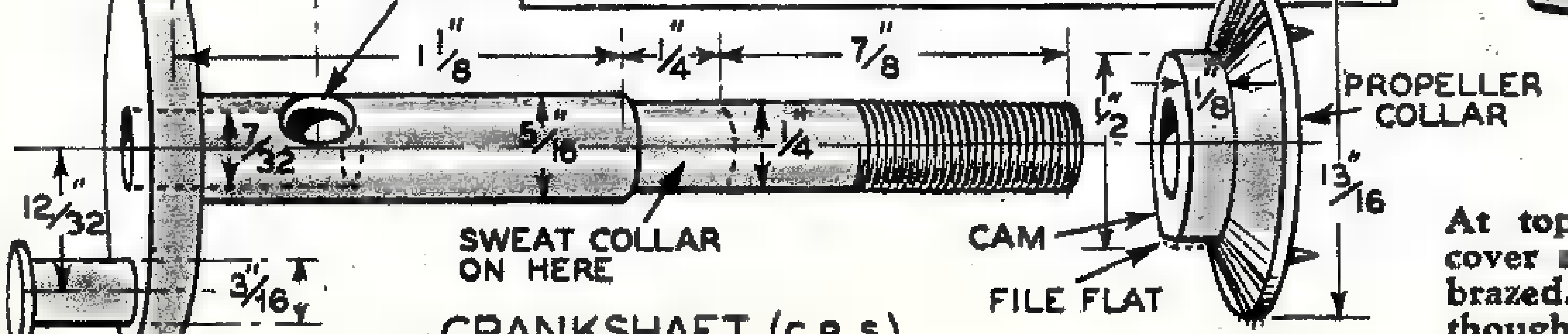
Left—Front view of motor. Original model had bent rod instead of knurled knob on carburetor. Above—Cylinder removed, showing piston and connecting rod of engine.


TRANSFER PORT COVER
TRANSFER PORT
SILVER SOLDER
20 GAUGE BRASS

Right—Carburetor is simply mixing valve. Air, sucked through 3/16″ hole, mixes with gas from needle hole. Timer is brass spring resting on cam and brass clamp. Below — Crankshaft assembly. Intake hole traps gas from carburetor, passes it to crankcase.

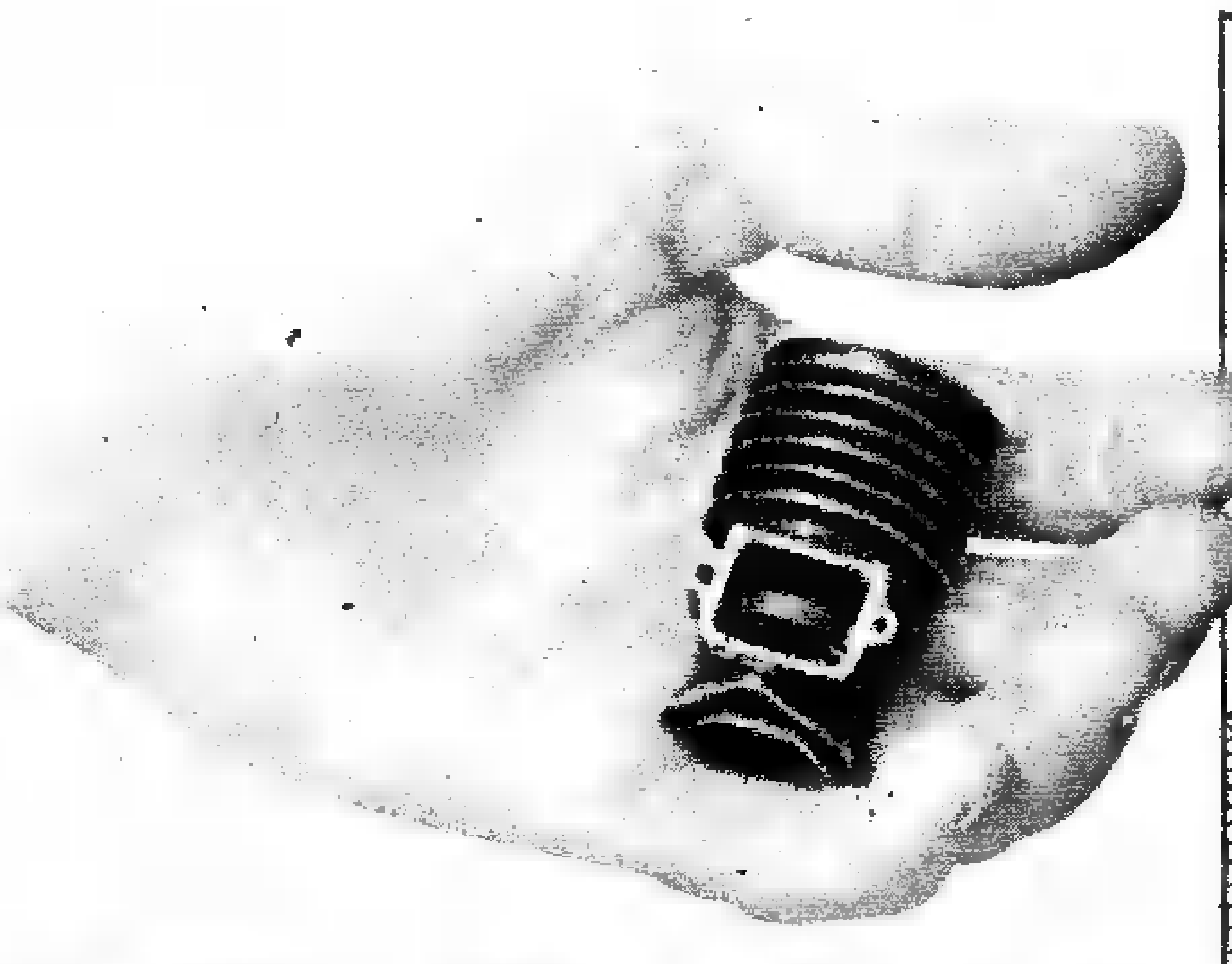

TO PRI. OF SPARK COIL
BRASS SPRING
SPARK POINTS
DRIVE FIT BRONZE BUSHING
3/8
1/2
BEARING BOSS
CLAMP
7/16
3/16
STIFF WIRE 1/16" ROD
SOLDER
NEEDLE HOLE
SERRATED COLLAR
SOLDER
TO GAS TANK
1/2
CARBURETOR


BAFFLE PLATE
1/8"
1/8
1/8"
1/8"
3/32
13/16"
PISTON—TURN FROM CAST IRON BLOCK
7/16
1/16"
13/16"
5/16"
7/32"
1/16"
1/2"
1/8"
MILL OUT
1/4
CONNECTING ROD
(SOLID DURAL)

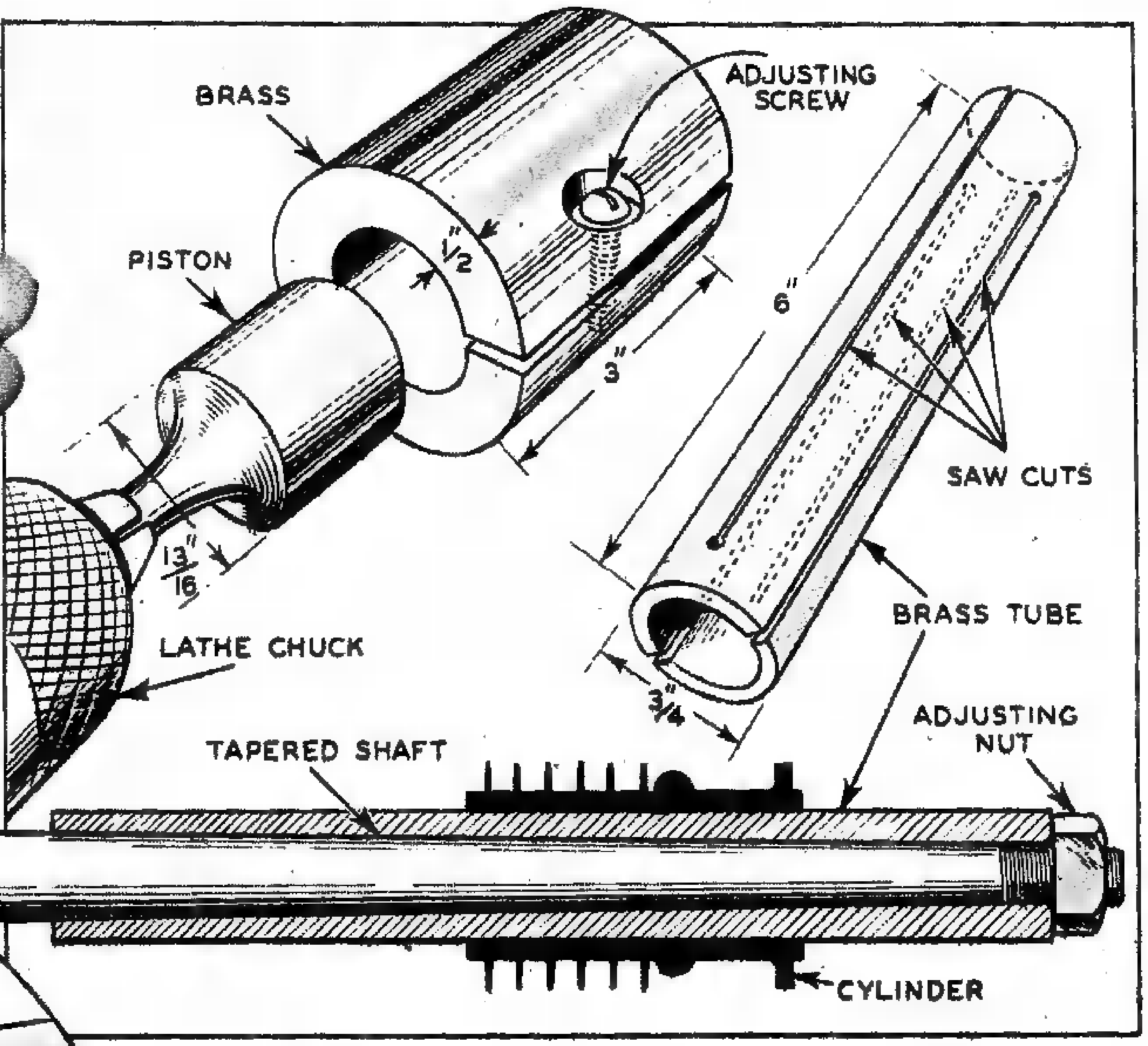

1/8"
3/8
INTAKE 3/16 HOLE
1 1/8"
1/4"
7/8"
7/32
5/16"
1/4
1/2"
1/8"
PROPELLER COLLAR
12/32
3/16
13/16
SWEAT COLLAR ON HERE
CAM
FILE FLAT
CRANKSHAFT (C.R.S.)

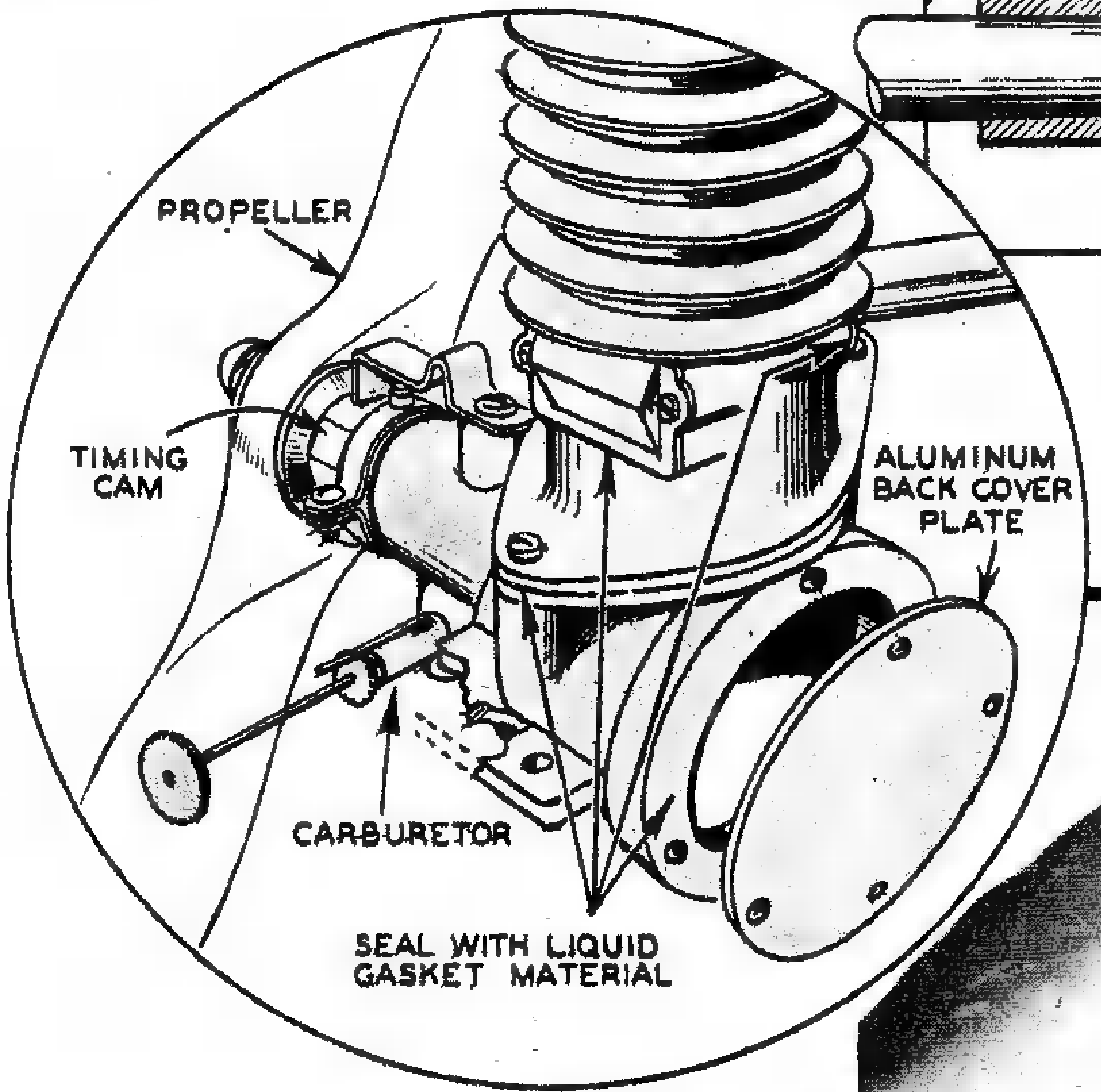
At top—Exhaust manifold and transfer port cover are cut from sheet brass and soldered or brazed. Rib in transfer port may be omitted though it improves efficiency of motor. Slot in piston allows gas to pass from crankcase to port.

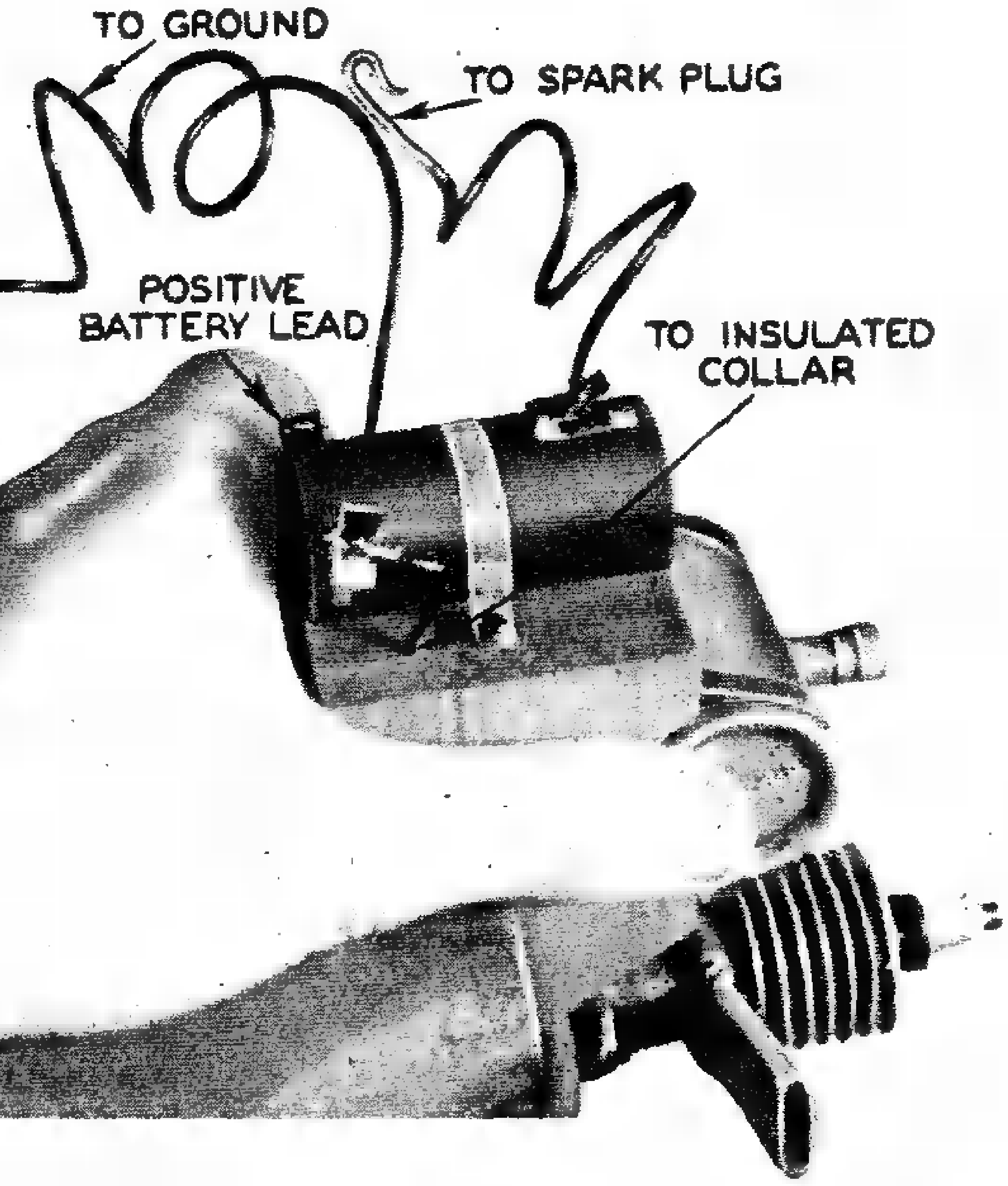
Lapping Method Insures Smooth Running Engine



Above—Size of cylinder. Transfer port is uncovered. Right—Good method to lap cylinder and piston. Use water soluble valve grinding compound, starting with coarse and finishing with fine grade until a mirror-like finish is obtained.


BRASS
ADJUSTING SCREW
PISTON
1/2"
6"
3"
SAW CUTS
13/16"
BRASS TUBE
LATHE CHUCK
3/4"
ADJUSTING NUT
TAPERED SHAFT
CYLINDER


PROPELLER
TIMING CAM
ALUMINUM BACK COVER PLATE
CARBURETOR
SEAL WITH LIQUID GASKET MATERIAL

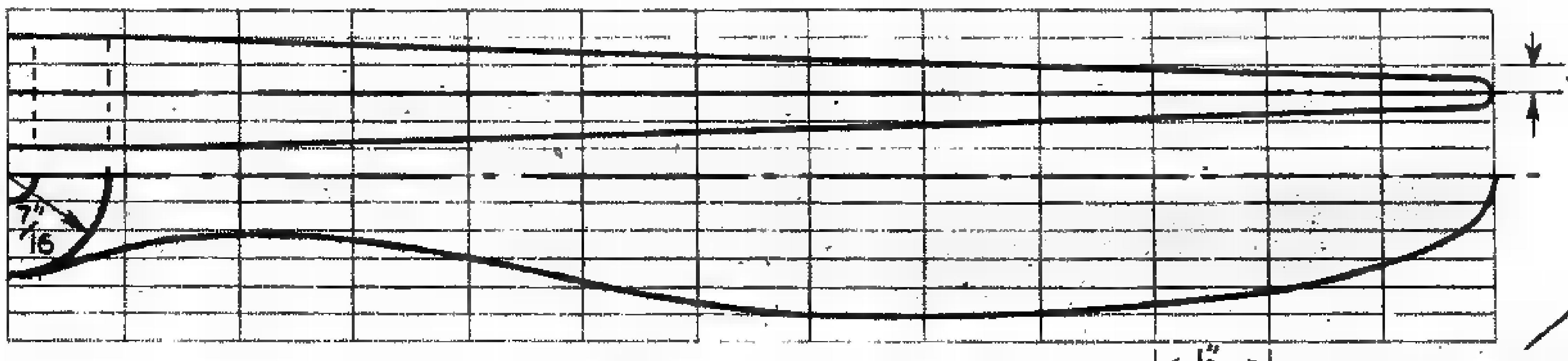

TO GROUND
TO SPARK PLUG
POSITIVE BATTERY LEAD
TO INSULATED COLLAR

Above—Seal all joints with gasket material when assembling. Note timing cam which permits spring to drop completing spark contact. Clamp is insulated from crankshaft housing. Right—Wiring of the model gasoline engine. Battery and coil ground leads should be securely connected to engine.

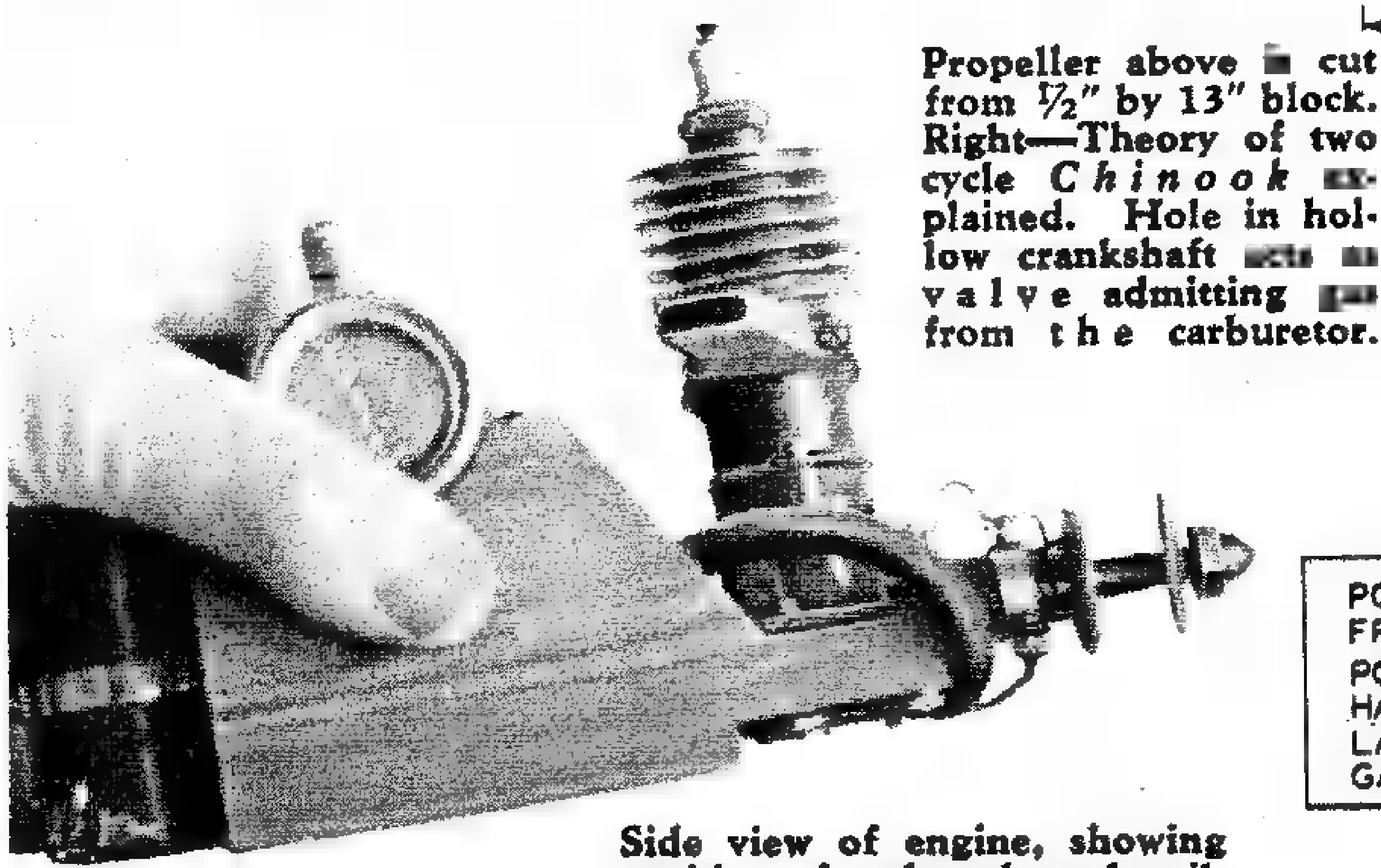
bronze bushing. This bushing is reamed out to take the 5/16" crankshaft. Remove the case from the chuck, square the cylinder land face, smooth it off, and drill the hold down bolt holes, as well as the tap holes for the 2/56 filister head machine screws that hold on the 1/16" aluminum back plate. This back plate is held sealed by the use of liquid gasket material obtainable at auto supply stores. Drill out the carburetor intake hole with a 3/16" drill, shove the reamer through the bearing hole to clean off the burr, and the bearing and crankcase are prepared save for the carburetor.

The carburetor is simplicity itself. It is merely a mixing valve, placed low in the engine to feed into the rotary valve, which prevents the engine from "Two Cycling", or reversing. Through the sleeve of the intake pipe run a 1/8" drill. Tap one side. On this, the right side facing the engine, insert a small brass sleeve 3/16" dia. into which a 1/16" rod has been tapped with a 72 thread. This rod con-

Operating Principle of Model Engine Is Simple



Propeller above is cut from ½" by 13" block. Right—Theory of two cycle *Chinook* explained. Hole in hollow crankshaft acts as valve admitting gas from the carburetor.

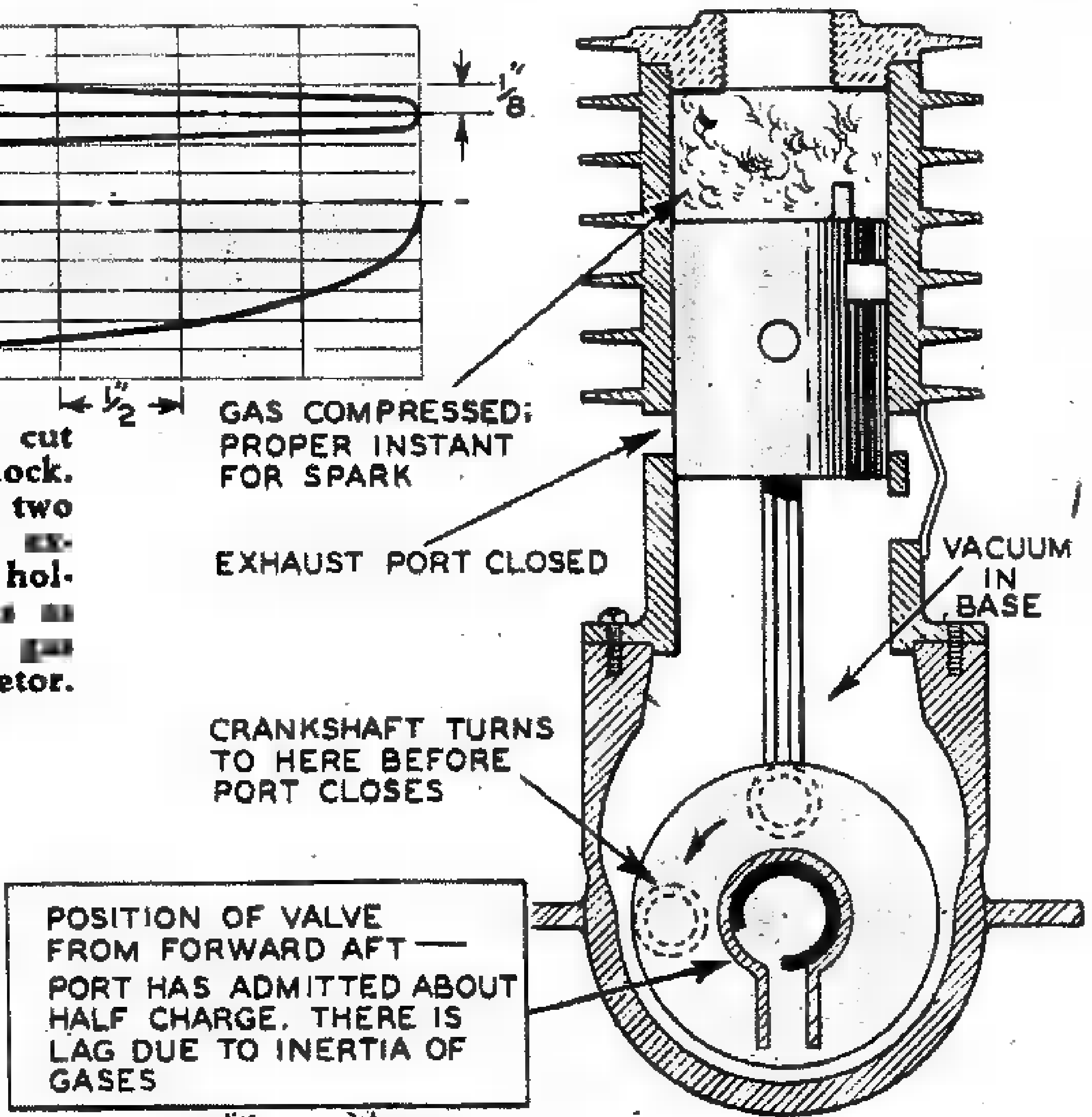


Side view of engine, showing position of tank and spark coil. Timing points are open. This is an indication that piston is on the exhaust stroke of cycle.

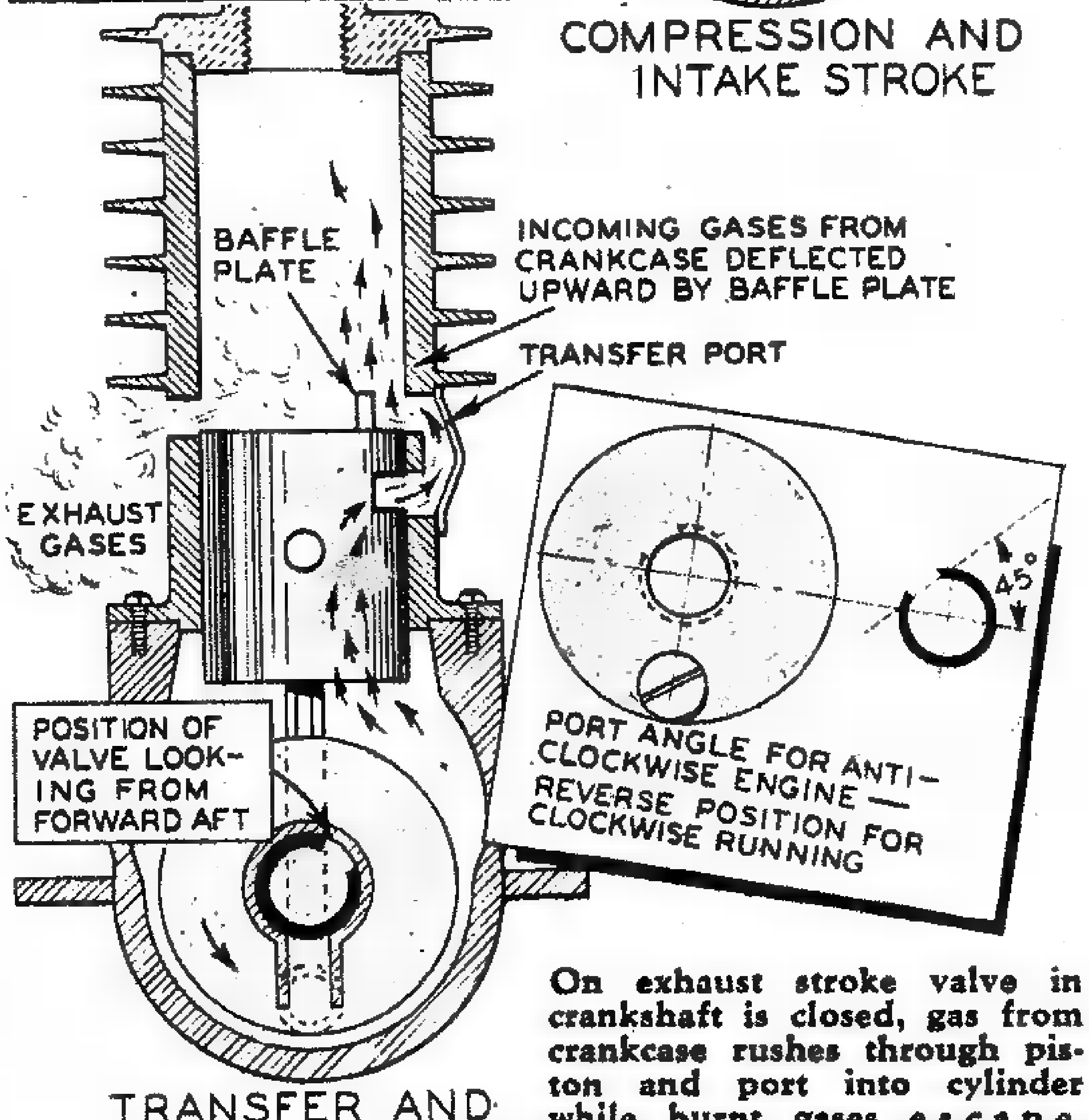
stitutes the needle valve, and must be pointed on one end.

In the opposite side of the intake, a short ½" length of steel with a needle hole, drilled in with a jewelers drill, is sweated. To this tube is doped a small rubber hose running to the toothpowder can which has been re-soldered to make a gasoline tank. The needle of the valve inpinges against the needle hole, and regulates the film of gasoline flowing into the intake. On the shank of the needle valve a small serrated collar is soldered. From the 3/16" retaining tube a piece of stiff wire is run to bear on this collar to prevent vibration from disturbing the mixture.

This engine has fixed timing in the interests of simplicity. The brass spring running from the little knob on the bearing, bears against a cam cut into the steel propeller collar. This cam is made by filing a flat spot 1/16" in depth with a ¼" face, placed opposite the opening in the hollow crankshaft. This c.r.s. collar is 13/16" diameter, and the face of the cam is ⅛" wide. The collar is secured to the crankshaft by a drive fit, touched with a bead of solder to sweat the two together. A touch of a soldering iron will loosen the collar and it may be reset to suit your idea of correct timing, but in practice it has been found best, with an engine made from the plans shown here, to set it opposite the intake port on the crankshaft.


GAS COMPRESSED; PROPER INSTANT FOR SPARK
EXHAUST PORT CLOSED
VACUUM IN BASE
CRANKSHAFT TURNS TO HERE BEFORE PORT CLOSES
POSITION OF VALVE FROM FORWARD AFT — PORT HAS ADMITTED ABOUT HALF CHARGE. THERE IS LAG DUE TO INERTIA OF GASES

COMPRESSION AND INTAKE STROKE

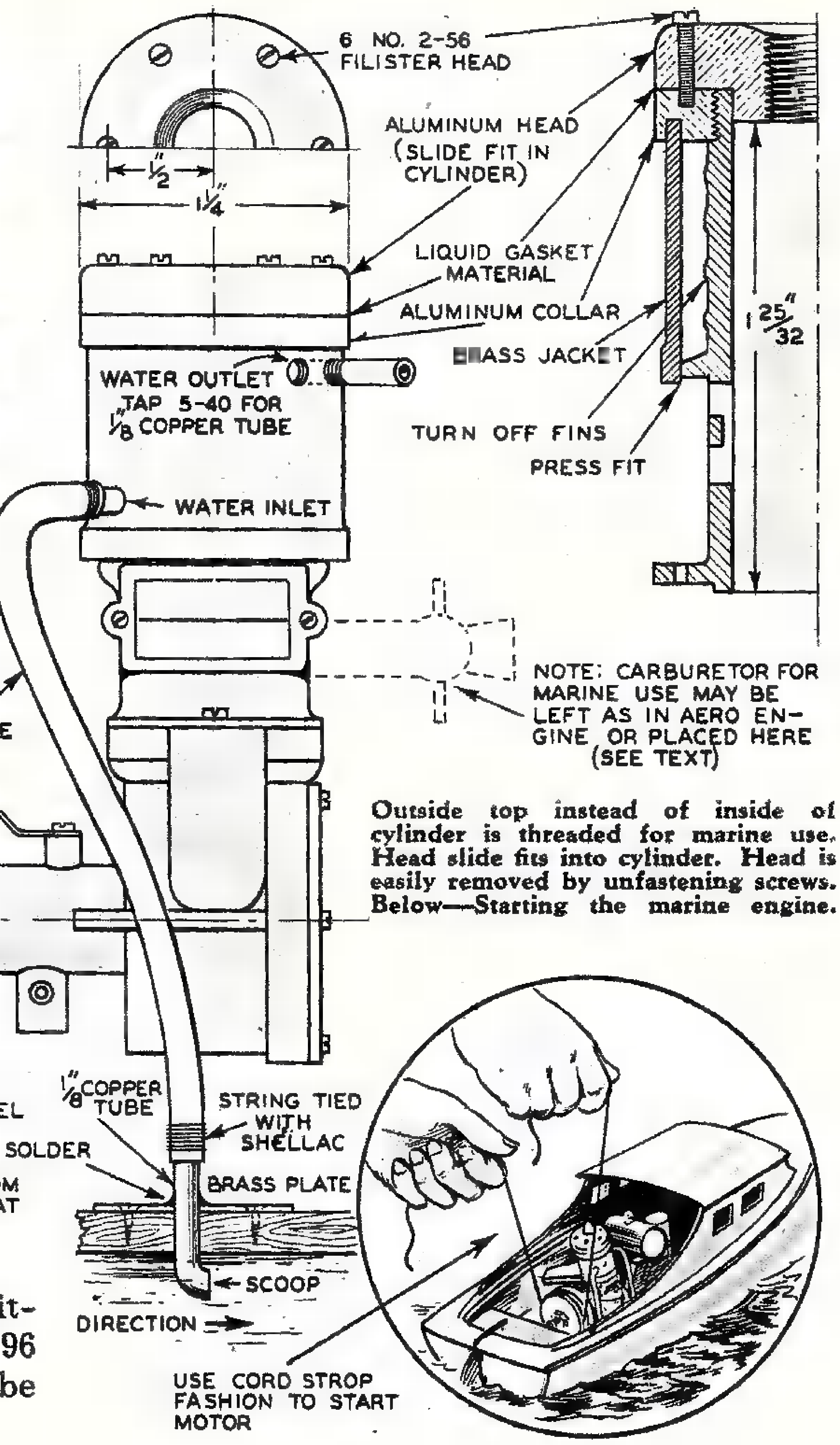

BAFFLE PLATE
INCOMING GASES FROM CRANKCASE DEFLECTED UPWARD BY BAFFLE PLATE
TRANSFER PORT
EXHAUST GASES
45°
PORT ANGLE FOR ANTI-CLOCKWISE ENGINE — REVERSE POSITION FOR CLOCKWISE RUNNING
POSITION OF VALVE LOOKING FROM FORWARD AFT

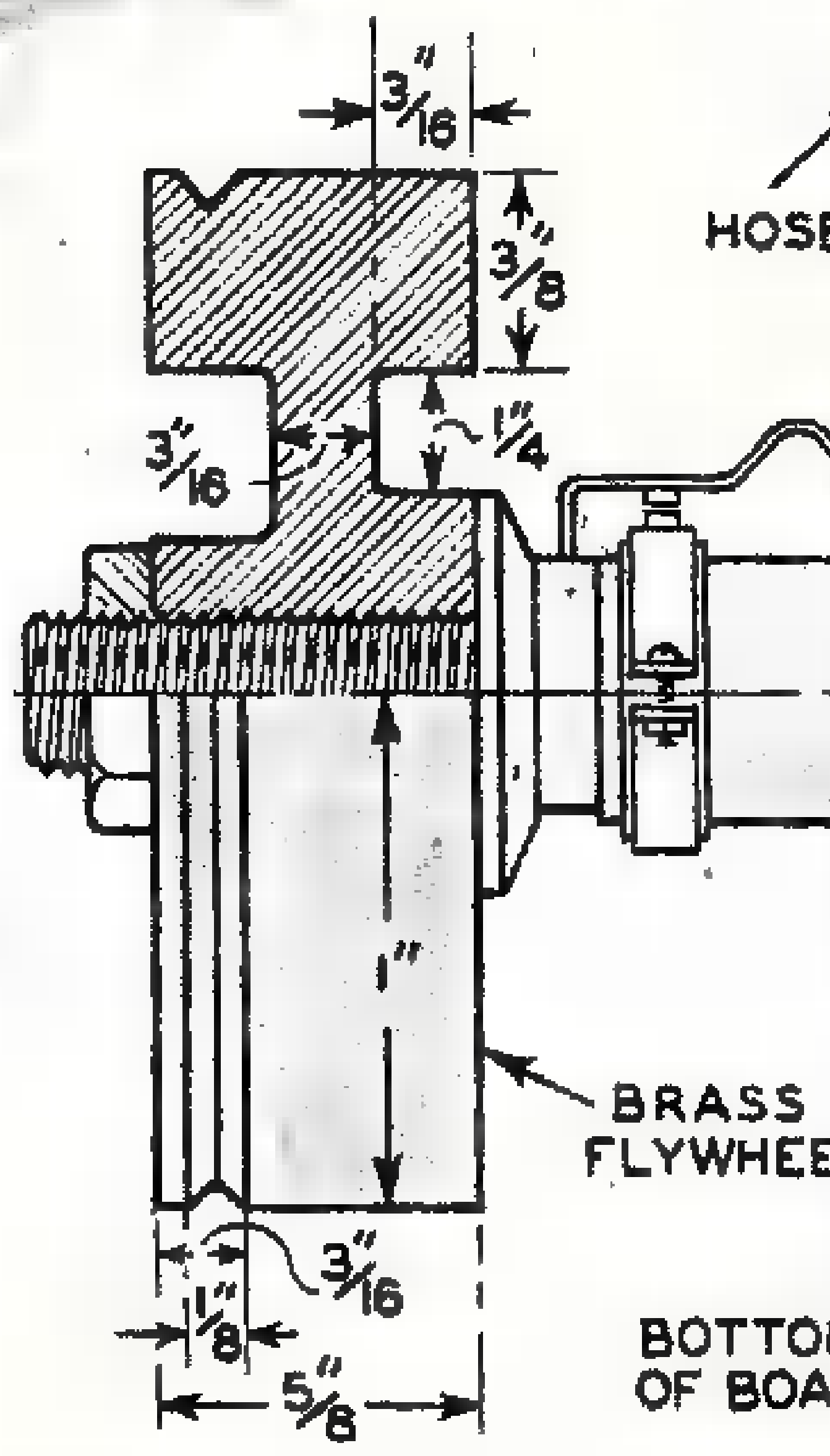
TRANSFER AND EXHAUST STROKE

On exhaust stroke valve in crankshaft is closed, gas from crankcase rushes through piston and port into cylinder while burnt gases escape. Change valve position as shown above for anti-clockwise engine.

The wiring for the timer is orthodox. One wire is grounded from the coil. The other wire leads from the coil to the insulated collar which is clamped around the bearing boss. Two platinum points off an old model T coil furnish contact, and when the cam rolls around the circuit is made. When the circuit is broken, the coil sends a hot spark to the plug. The spark plug is a midget. The secondary wire from the coil of course leads to the spark plug. Across the contact points a small wireless condenser is bridged to reduce the sparking at the points. One wire of the battery goes to the post in the coil, the other

Engine With Water Jacket Powers Model Boats


6 NO. 2-56 FILISTER HEAD
1/2"
1 1/4"
ALUMINUM HEAD (SLIDE FIT IN CYLINDER)
LIQUID GASKET MATERIAL
ALUMINUM COLLAR
BRASS JACKET
25/32"
WATER OUTLET TAP 5-40 FOR 1/8" COPPER TUBE
TURN OFF FINS
PRESS FIT
WATER INLET
HOSE
NOTE: CARBURETOR FOR MARINE USE MAY BE LEFT AS IN AERO ENGINE OR PLACED HERE (SEE TEXT)
1/8" COPPER TUBE
STRING TIED WITH SHELLAC
SOLDER
BRASS PLATE
BOTTOM OF BOAT
SCOOP
DIRECTION
USE CORD STROP FASHION TO START MOTOR


3/16"
3/8"
3/16"
1/4
1"
BRASS FLYWHEEL
1/8"
3/16
5/8"

***Chinook* is easily marined. Fins are turned off and cylinder jacket turned out as shown. Brass flywheel is secured by hex nut sweat soldered to lock it in place. Scoop at bottom of model boat forces water to engine. Outlet should be as near top of jacket as possible to prevent steam pockets. Carburetor placed as shown by dotted lines develop more power in marine version.**

Outside top instead of inside of cylinder is threaded for marine use. Head slide fits into cylinder. Head is easily removed by unfastening screws. Below—Starting the marine engine.

to ground. Construction of a spark coil suitable for this model was described on page 96 of the April issue. Ready made coils can be purchased from model supply houses.

The cylinder is of cast iron. The pattern is so simple it will require no explanation, except to say that no attempt should be made to core the bore, the ports, or the fins. They can, in one job, be turned off on the lathe, and the ports can be routed out on the drill press in far less time. Chuck the casting in the lathe and face off the cylinder skirt. Bore successive holes through the bore, increasing the size of holes by 1/4" until the bore 3/4" is reached, when it should be reamed with a parallel reamer. Final finishing is made by lapping the piston.

The length of the cylinder is nominally 2", as shown on the drawing, but it is the usual practice for model makers to make this length slightly longer, so that the final length and the cutting of the thread for the cylinder head can be made to just clear the baffle plate on the piston. When this length has been determined from the job, the cylinder may be removed, cut to length, and the seat for the 72 thread for the cylinder head can be turned in and threaded.

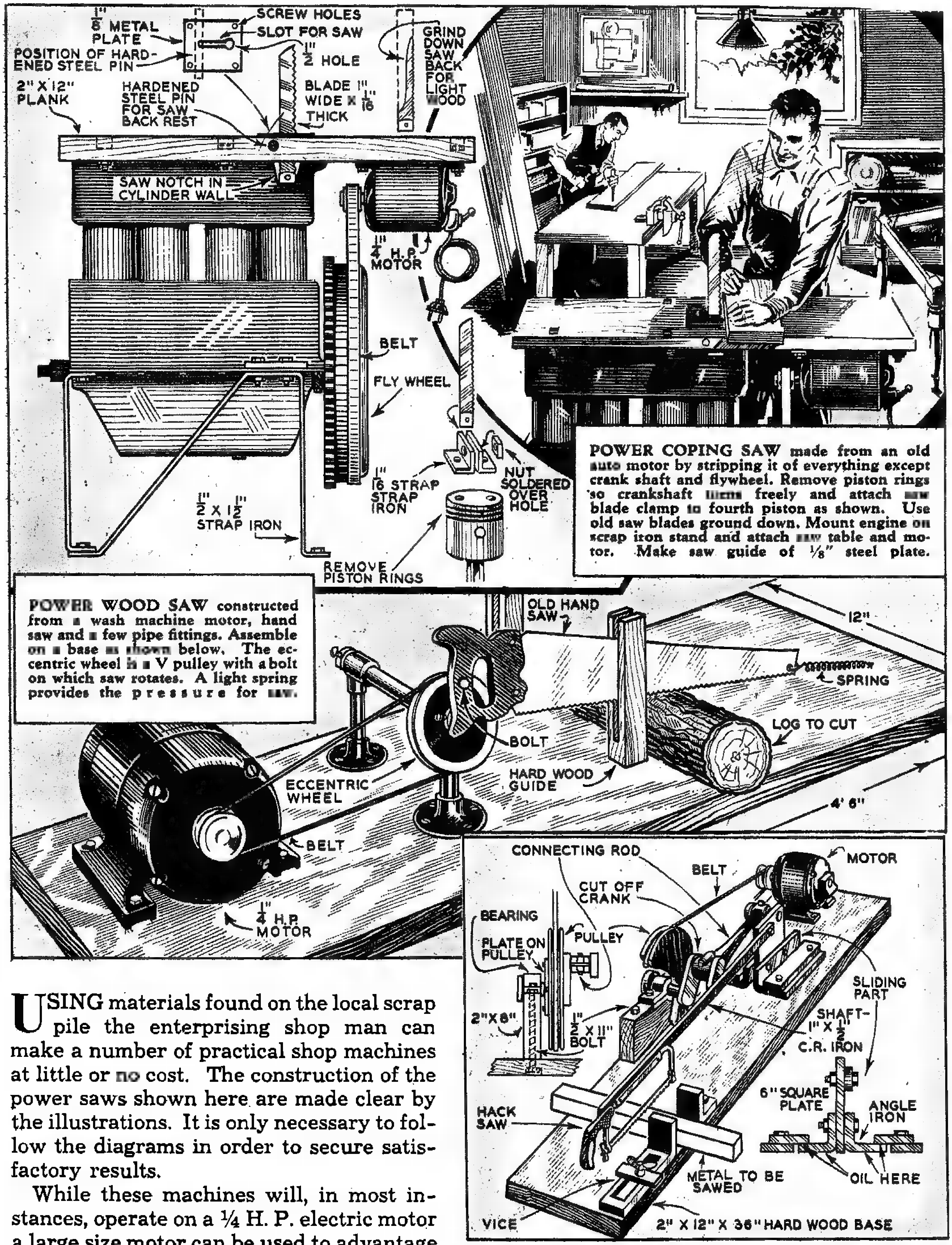
The ports are finished off by drilling successive holes, and finishing true with a file. Tap the port cover screw holes and then make the port covers.

The intake transfer port is made of 20 gauge brass, filed to shape. A light brass cover is fitted in and silver soldered. The port is gasketed with liquid gasket material.

The exhaust manifold is made the same way. Cut the cover plate from 20 gauge brass. Shape the manifold out of sheet brass and

[*Continued on page* 128]

POWER SAW BUILT FROM SCRAP PARTS


1/8" METAL PLATE
SCREW HOLES
SLOT FOR SAW
POSITION OF HARDENED STEEL PIN
1/2" HOLE
GRIND DOWN SAW BACK FOR LIGHT WOOD
2" X 12" PLANK
HARDENED STEEL PIN FOR SAW BACK REST
BLADE 1" WIDE X 1/16" THICK
SAW NOTCH IN CYLINDER WALL
1/4 H.P. MOTOR
BELT
FLY WHEEL
1/16" STRAP STRAP IRON
NUT SOLDERED OVER HOLE
1/2" X 1 1/2" STRAP IRON
REMOVE PISTON RINGS
OLD HAND SAW
12"
SPRING
LOG TO CUT
BOLT
HARD WOOD GUIDE
ECCENTRIC WHEEL
4' 6"
BELT
1/4 H.P. MOTOR
CONNECTING ROD
BELT
MOTOR
CUT OFF CRANK
BEARING
PLATE ON PULLEY
PULLEY
SLIDING PART
2"X8"
1/2" X 11" BOLT
SHAFT- 1" X 1/2" C.R. IRON
6" SQUARE PLATE
ANGLE IRON
HACK SAW
METAL TO BE SAWED
OIL HERE
VICE
2" X 12" X 36" HARD WOOD BASE

POWER COPING SAW made from an old auto motor by stripping it of everything except crank shaft and flywheel. Remove piston rings so crankshaft turns freely and attach saw blade clamp to fourth piston as shown. Use old saw blades ground down. Mount engine on scrap iron stand and attach saw table and motor. Make saw guide of 1/8" steel plate.

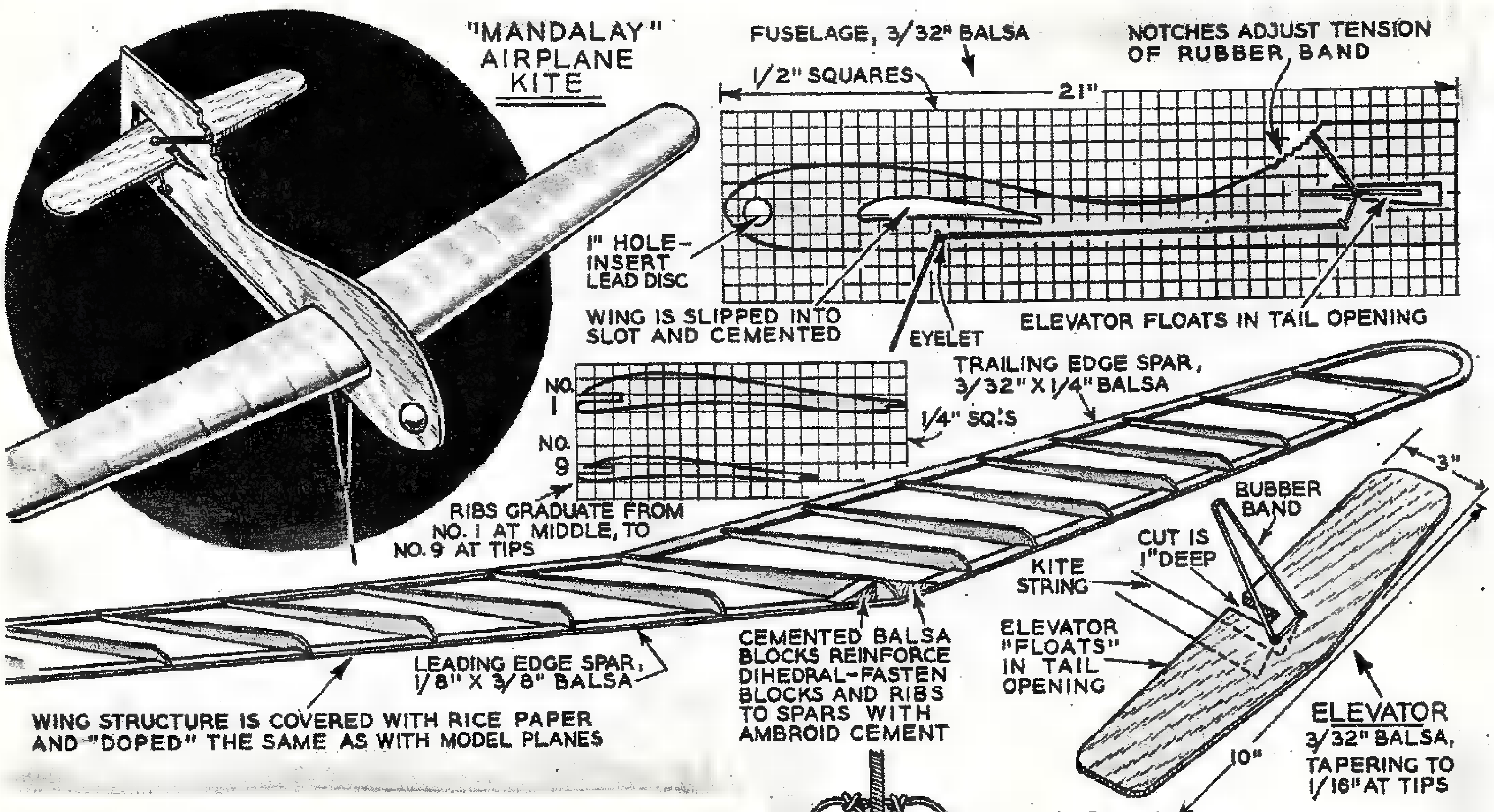
POWER WOOD SAW constructed from a wash machine motor, hand saw and a few pipe fittings. Assemble on a base as shown below. The eccentric wheel is a V pulley with a bolt on which saw rotates. A light spring provides the pressure for saw.

POWER HACK SAW that will give very satisfactory results uses an auto connecting rod, cut off as shown above, to drive hack saw. A large wooden pulley powered by a ¼ H. P. electric motor operates connecting rod. Metal is held rigid by simple vise.

USING materials found on the local scrap pile the enterprising shop man can make a number of practical shop machines at little or no cost. The construction of the power saws shown here are made clear by the illustrations. It is only necessary to follow the diagrams in order to secure satisfactory results.

While these machines will, in most instances, operate on a ¼ H. P. electric motor a large size motor can be used to advantage on the power wood-metal cutting coping saw. The power hack saw and wood saw require only a light motor for successful operation.

CAPTIVE Model PLANES

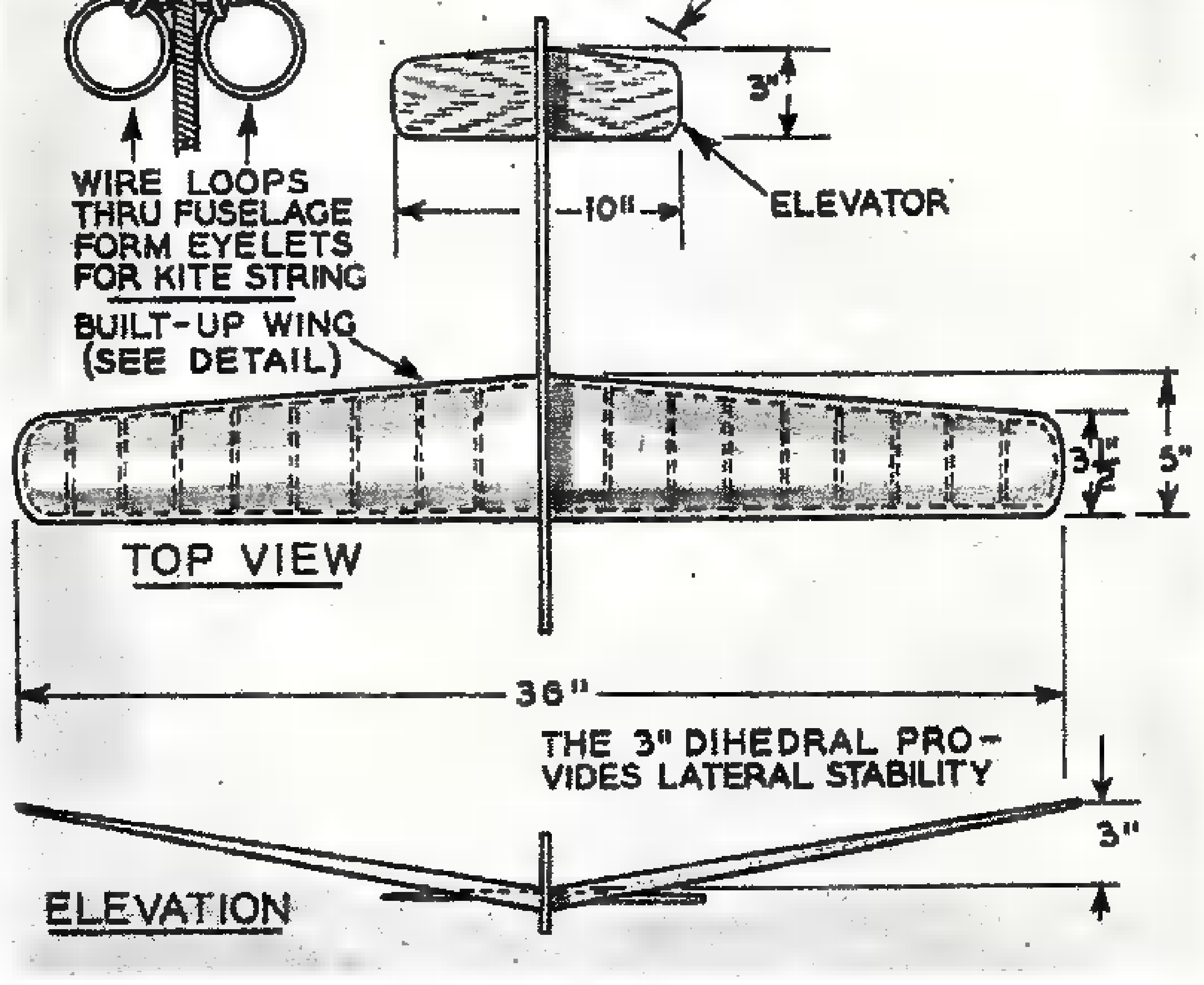

"MANDALAY" AIRPLANE KITE
FUSELAGE, 3/32" BALSA
1/2" SQUARES
21"
NOTCHES ADJUST TENSION OF RUBBER BAND
1" HOLE-INSERT LEAD DISC
WING IS SLIPPED INTO SLOT AND CEMENTED
EYELET
ELEVATOR FLOATS IN TAIL OPENING
NO. 1
NO. 9
1/4" SQ.'S
TRAILING EDGE SPAR, 3/32" X 1/4" BALSA
RIBS GRADUATE FROM NO. 1 AT MIDDLE, TO NO. 9 AT TIPS
3"
RUBBER BAND
CUT IS 1" DEEP
KITE STRING
ELEVATOR "FLOATS" IN TAIL OPENING
LEADING EDGE SPAR, 1/8" X 3/8" BALSA
CEMENTED BALSA BLOCKS REINFORCE DIHEDRAL-FASTEN BLOCKS AND RIBS TO SPARS WITH AMBROID CEMENT
WING STRUCTURE IS COVERED WITH RICE PAPER AND "DOPED" THE SAME AS WITH MODEL PLANES
10"
ELEVATOR 3/32" BALSA, TAPERING TO 1/16" AT TIPS

by DICK COLE

DOWN through the ages the common kite has played a very important part in the advancement of science. The early Chinese used kites in the construction of bridges, Franklin used the kite in his electrical experiments, and the kite was used, too, by the Wright brothers in their early aviation experiments at Kitty Hawk.

Although kite flying has been one of the chief pastimes of youth throughout the world it takes on new form with kites being fashioned after modern aircraft. The kite plane opens new fields to the model plane enthusiast who can now build ships that will soar for hours instead of merely jumping off the ground for a few seconds.

The simplest of airplane kites is the "Mandalay" which conforms closely to an ordinary model glider, except that the dihedral angle is somewhat greater. Then too the operator is able to control the rise and fall of the plane simple by pulling on the kite string. The string, which passes through an eyelet directly under the center support of the wing and then along the fuselage through another eyelet attached to the elevators, permits their adjustment while plane is in flight. All three types of planes illustrated are constructed along the same general lines. Cut the plane's fuselages from $\frac{3}{32}''$ balsa wood and build up the wing in the same manner as in regular model plane construction. Cover the wing structure with Japanese tissue and then apply the dope so as to draw the wing covering tight.


WIRE LOOPS THRU FUSELAGE FORM EYELETS FOR KITE STRING
3"
10"
ELEVATOR
BUILT-UP WING (SEE DETAIL)
3½"
5"
TOP VIEW
36"
THE 3" DIHEDRAL PROVIDES LATERAL STABILITY
3"
ELEVATION

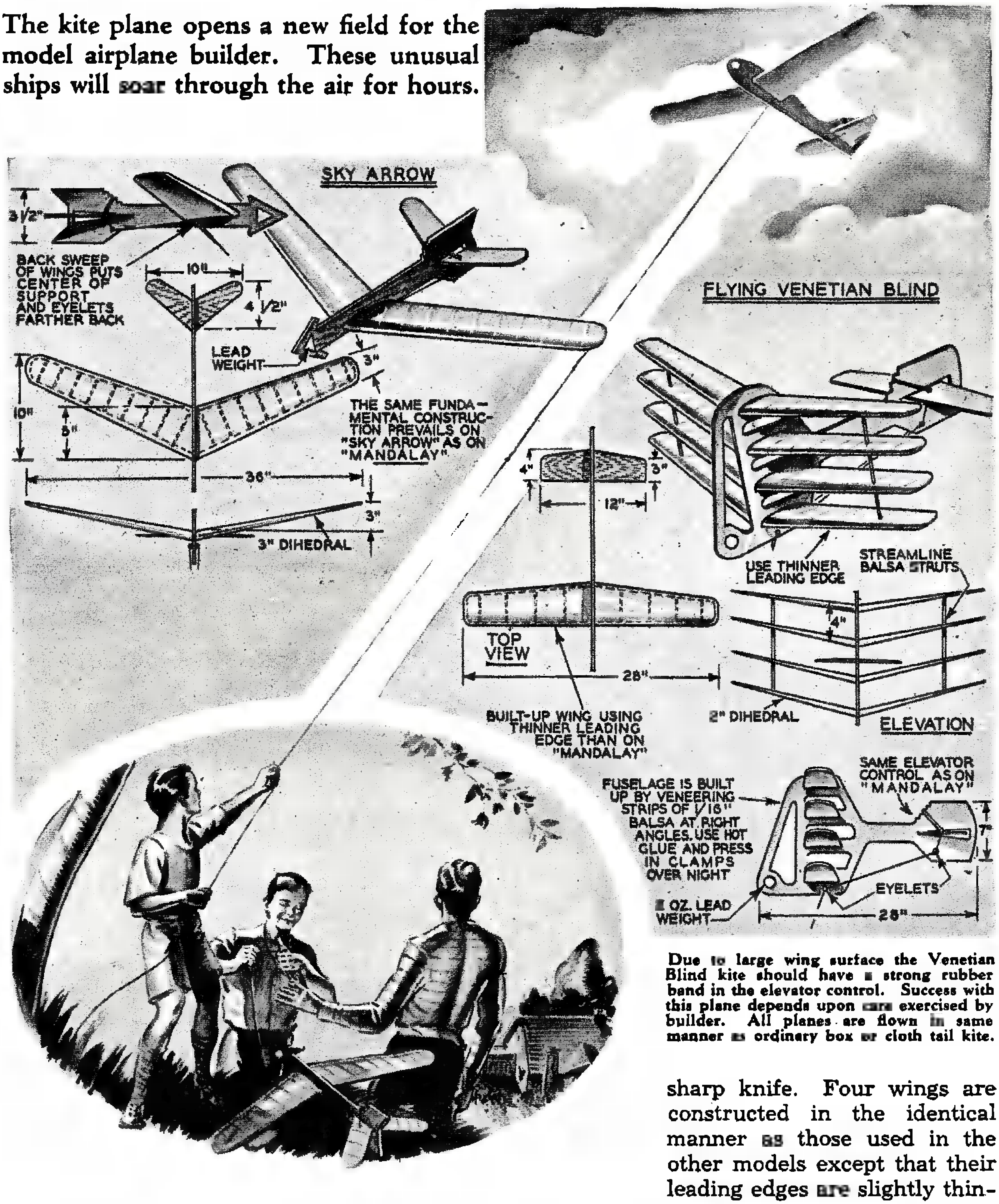
Both Mandalay and Sky Arrow kites are constructed according to the plans shown above except for slight physical changes. All planes use the same type of rubber band elevator control.

Cut the elevators from $\frac{3}{32}''$ balsa to the size and shape shown. The angle of the elevator is governed by a rubber band which is attached to the fuselage. Several sizes of rubber bands should be tried in order to secure the correct tension. A 1" hole cut in the nose of the plane holds a small piece of lead used to balance the plane when in flight.

In constructing the "Sky Arrow" the procedure is practically the same as for the

Become FLYING KITES

The kite plane opens a new field for the model airplane builder. These unusual ships will soar through the air for hours.

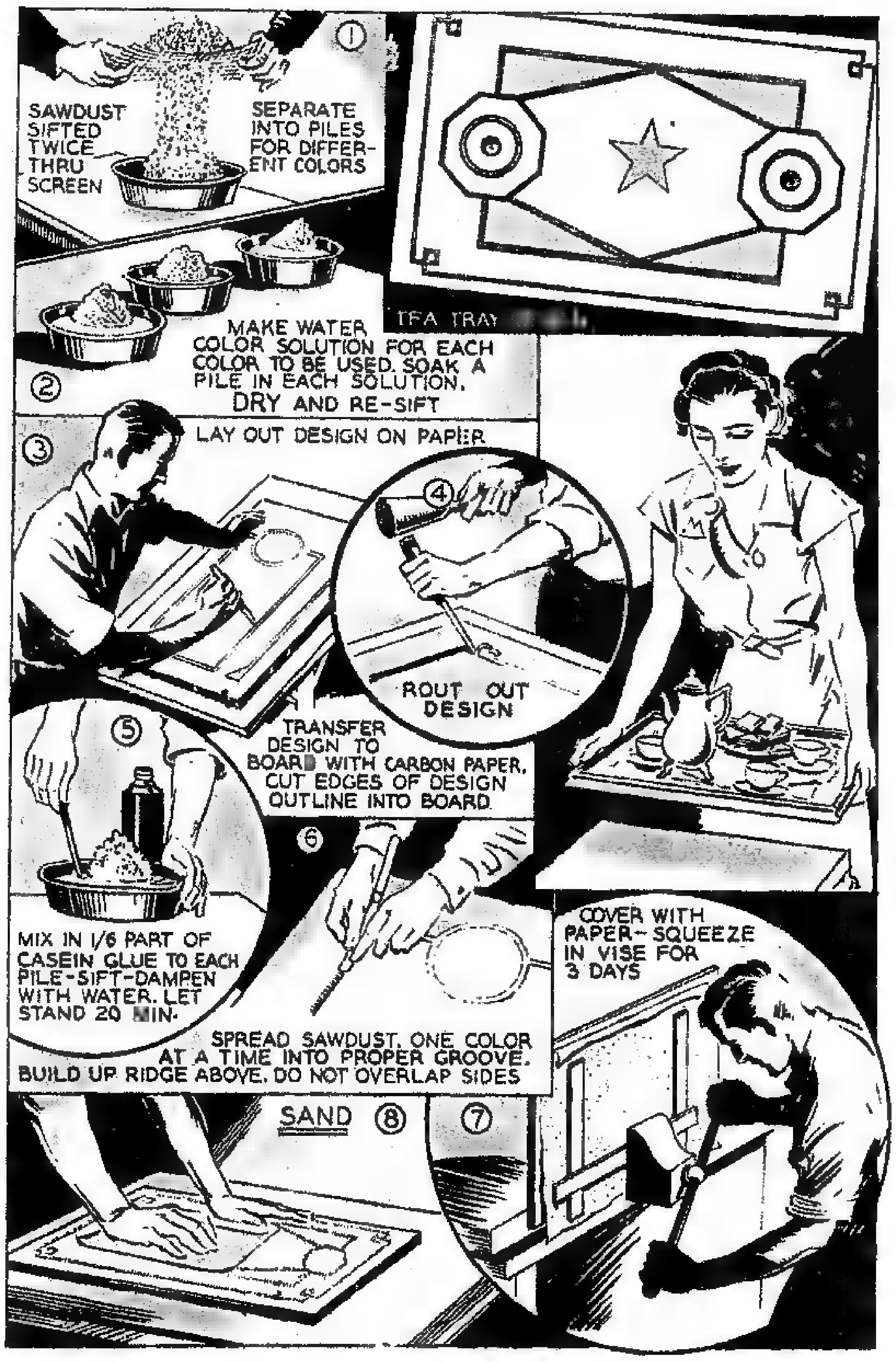

SKY ARROW
3 1/2"
BACK SWEEP OF WINGS PUTS CENTER OF SUPPORT AND EYELETS FARTHER BACK
10"
4 1/2"
LEAD WEIGHT
3"
10"
5"
THE SAME FUNDAMENTAL CONSTRUCTION PREVAILS ON "SKY ARROW" AS ON "MANDALAY"
36"
3"
3" DIHEDRAL
FLYING VENETIAN BLIND
4"
3"
12"
USE THINNER LEADING EDGE
STREAMLINE BALSA STRUTS
4"
TOP VIEW
28"
BUILT-UP WING USING THINNER LEADING EDGE THAN ON "MANDALAY"
2" DIHEDRAL
ELEVATION
SAME ELEVATOR CONTROL AS ON "MANDALAY"
FUSELAGE IS BUILT UP BY VENEERING STRIPS OF 1/16" BALSA AT RIGHT ANGLES. USE HOT GLUE AND PRESS IN CLAMPS OVER NIGHT
7"
[illegible] OZ. LEAD WEIGHT
EYELETS
28"

Due to large wing surface the Venetian Blind kite should have a strong rubber band in the elevator control. Success with this plane depends upon care exercised by builder. All planes are flown in same manner as ordinary box or cloth tail kite.

"Mandalay". In this model, though, the back sweep of the wings requires that the eyelets for kite string be located farther back. The "Flying Venetian Blind" is somewhat different so far as fuselage construction is concerned. Here two sheets of $\frac{1}{16}$" balsa are veneered together then cut to shape with a sharp knife. Four wings are constructed in the identical manner as those used in the other models except that their leading edges are slightly thinner. The rubber band on elevator is also heavier than ones used on the other kites. The plane kites are flown in the same manner as the conventional tail or box kites.

Although a little more difficult to launch than the ordinary kites the planes are not at all difficult to keep in the air.

Inlay Workshop Projects With Sawdust Paste



①
SAWDUST SIFTED TWICE THRU SCREEN
SEPARATE INTO PILES FOR DIFFERENT COLORS
②
MAKE WATER COLOR SOLUTION FOR EACH COLOR TO BE USED. SOAK A PILE IN EACH SOLUTION. DRY AND RE-SIFT
TEA TRAY
③
LAY OUT DESIGN ON PAPER
④
ROUT OUT DESIGN
⑤
TRANSFER DESIGN TO BOARD WITH CARBON PAPER. CUT EDGES OF DESIGN OUTLINE INTO BOARD
⑥
MIX IN 1/6 PART OF CASEIN GLUE TO EACH PILE-SIFT-DAMPEN WITH WATER. LET STAND 20 MIN.
SPREAD SAWDUST, ONE COLOR AT A TIME INTO PROPER GROOVE. BUILD UP RIDGE ABOVE. DO NOT OVERLAP SIDES
COVER WITH PAPER-SQUEEZE IN VISE FOR 3 DAYS
⑦
SAND ⑧

Inlaying with the paste inlay is simple provided the various stages in the process, as shown above, are carefully followed. Designs may be inlayed in as trays, tables; in fact, anything.

INTERESTING and beautiful inlay work can be done in the home shop without the use of inlay woods and at little or no expense. The only materials required for this unusual process is some fine sawdust, casein glue, and water color dyes.

After deciding upon the article you wish to decorate select a suitable design and trace it upon the wood with carbon paper. Next, carve or route your design using chisels or wood carving tools. The grooves are cut to a depth of ⅛-inch with vertical, square edges. Care should be taken not to splinter the edges of the routed part.

When the carving has been completed mixing of the inlaying paste is taken up. Carefully sift a quantity of fine sawdust twice through a fine wire screen then make up weak solutions of water color paints or dies, in colors to match as nearly as possible natural wood colors. Soak amounts of the sawdust in each color, then remove, spread out and allow to dry.

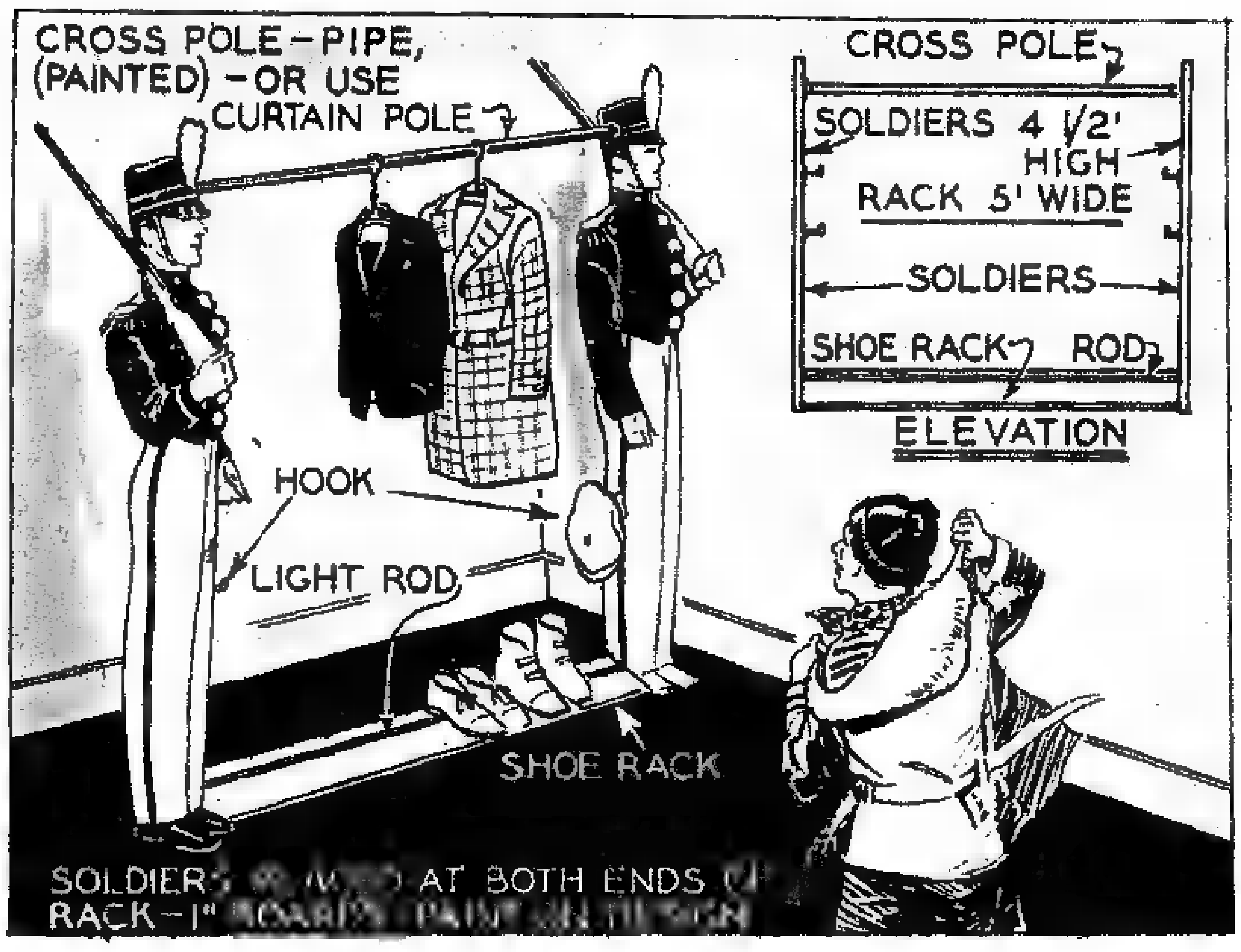
When the sawdust has dried it is ready to be made into the inlaying paste. To each six parts of sawdust add one part of dry casein glue then sift through the screening so as to thoroughly mix the two together. Cold water is added to the mixture until it is in the form of a soft putty. Using a spatula or putty knife apply the paste pressing it firmly in the grooves. As the paste will shrink when dry be sure to fill grooves well. After all grooves have been filled lay a sheet of paper over the design followed by a smooth board. Clamp in vise for three days, remove and sand until design appears.

A Clothes Rack for Junior's Room

WHAT boy wouldn't be proud to own this novel cadet coat rack. With it occupying a corner of his room there would no longer be the usual pile of clothing strewn upon the floor. Any child will get a great deal of pleasure in hanging up his clothes and at the same time form a lifetime habit.

The soldiers are cut from one-inch stock according to the builder's own ideas. If desired the soldier may be first drawn on paper then traced on the wood. A keyhole saw or power band saw may be used in cutting out the design. When this work has been completed attach a board across the bottom for the shoe rack and a curtain pole or a length of iron pipe, flanged at each end, for the clothing support.

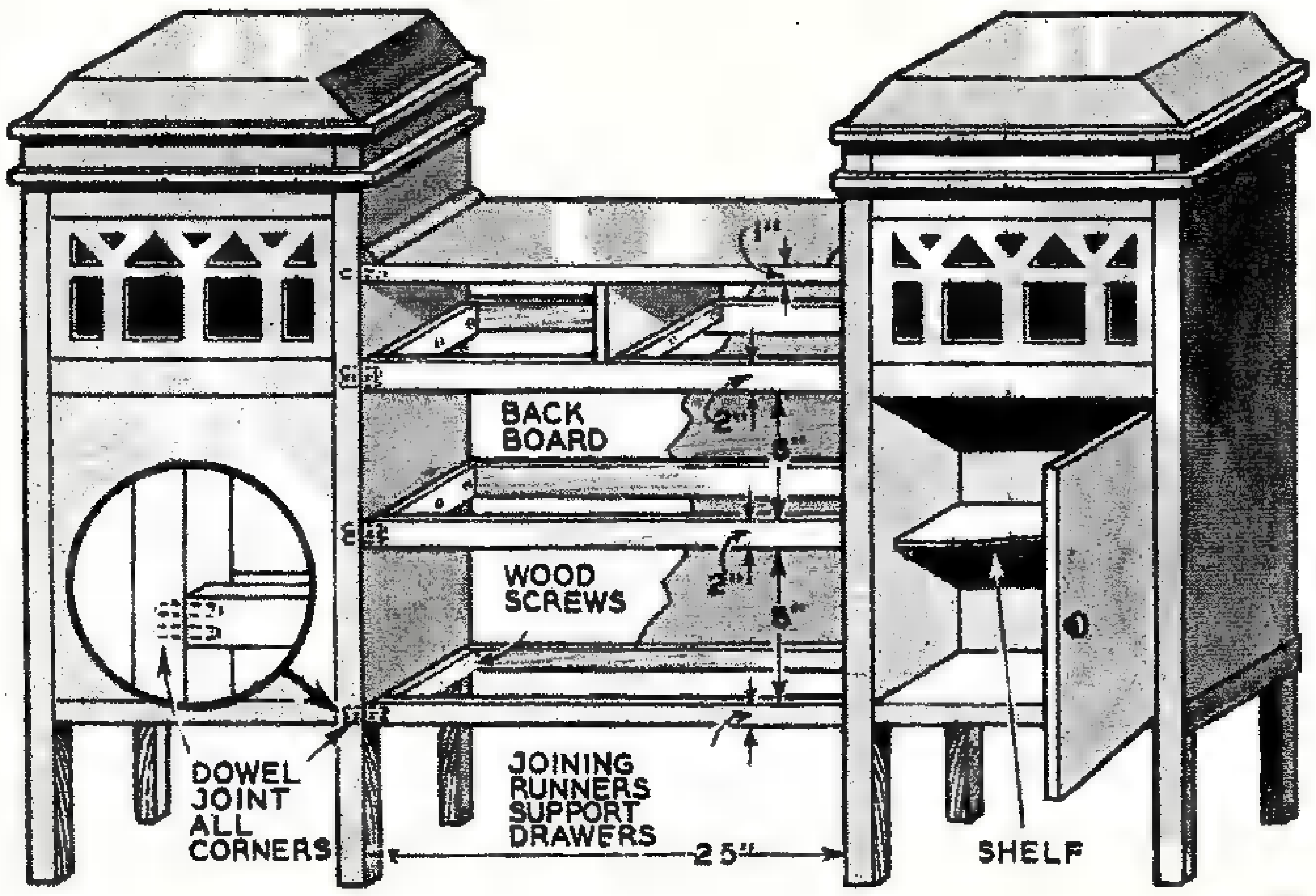
Complete the stand by painting the soldiers red, white and blue. Paint the shoes and clothing support black and the shoe rack white.



CROSS POLE-PIPE, (PAINTED)-OR USE CURTAIN POLE
CROSS POLE
SOLDIERS 4 1/2' HIGH
RACK 5' WIDE
SOLDIERS
SHOE RACK
ROD
ELEVATION
HOOK
LIGHT ROD
SHOE RACK
SOLDIERS OF WOOD AT BOTH ENDS OF RACK-1" BOARD PAINT IN DESIGN

This pair of Cadets stand guard over Junior's clothes while he is at play and make him want to hang up his togs when he comes in. The soldier clothes rack can be built in a few hours.

Old Phonographs Make Useful Furniture


BACK BOARD
WOOD SCREWS
DOWEL JOINT ALL CORNERS
JOINING RUNNERS SUPPORT DRAWERS
25"
SHELF
1"
2"
6"
2"
6"

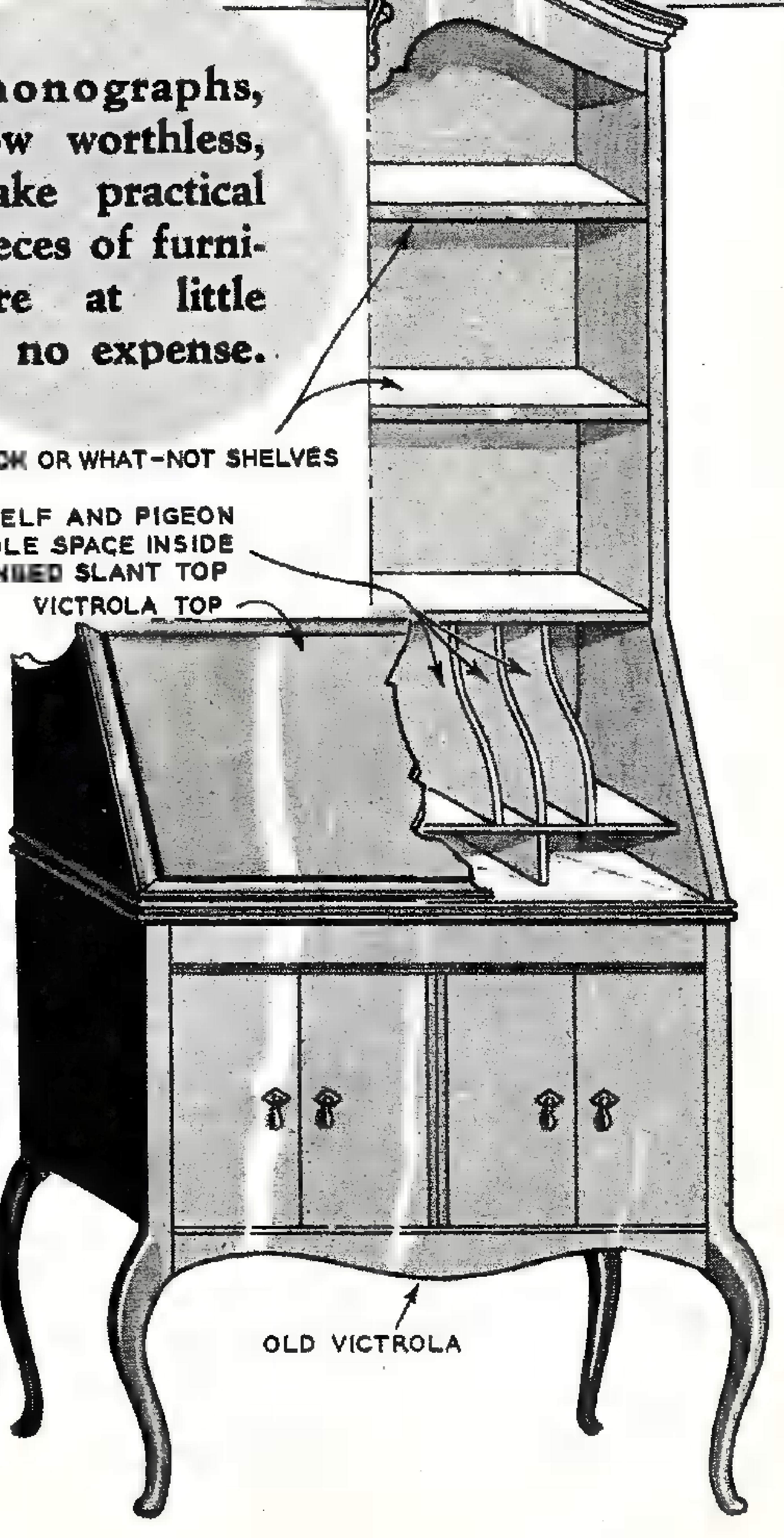
This attractive buffet can be constructed in a few hours from two old phonographs. An orthophonic victrola can be easily made into the Governor Winthrop type desk shown at right.

THAT old phonograph which has been standing in a corner of the attic ever since the coming of radio can be converted into a practical piece of furniture at very little cost. When finished the article will equal in many instances, the manufactured product.

If you have a phonograph of the orthophonic type it can be made into an attractive Governor Winthrop desk. Make your patterns after the styling used on the original then cut or have your local mill cut them from whatever wood you choose. Reverse the hinges on the phonograph's lid, remove the motor and reproducer and mount the shelves to the top of the phonograph with four small right angle brackets. Complete the desk by finishing the shelves in same color as the rest of the desk. If desk is too high saw 1½" from bottom of each leg. Replace the original knobs with drop handles.

The attractive buffet shown above was made from scrap lumber and two phonographs purchased at a secondhand store at $1 each. The motors and reproducers were removed and the two cabinets jointed with draw rails fastened in place with dowel rods glued securely. The drawer slides are attached with wood screws as is the plywood back. Two large and two small drawers are required and may be made or taken from some old piece of furniture.

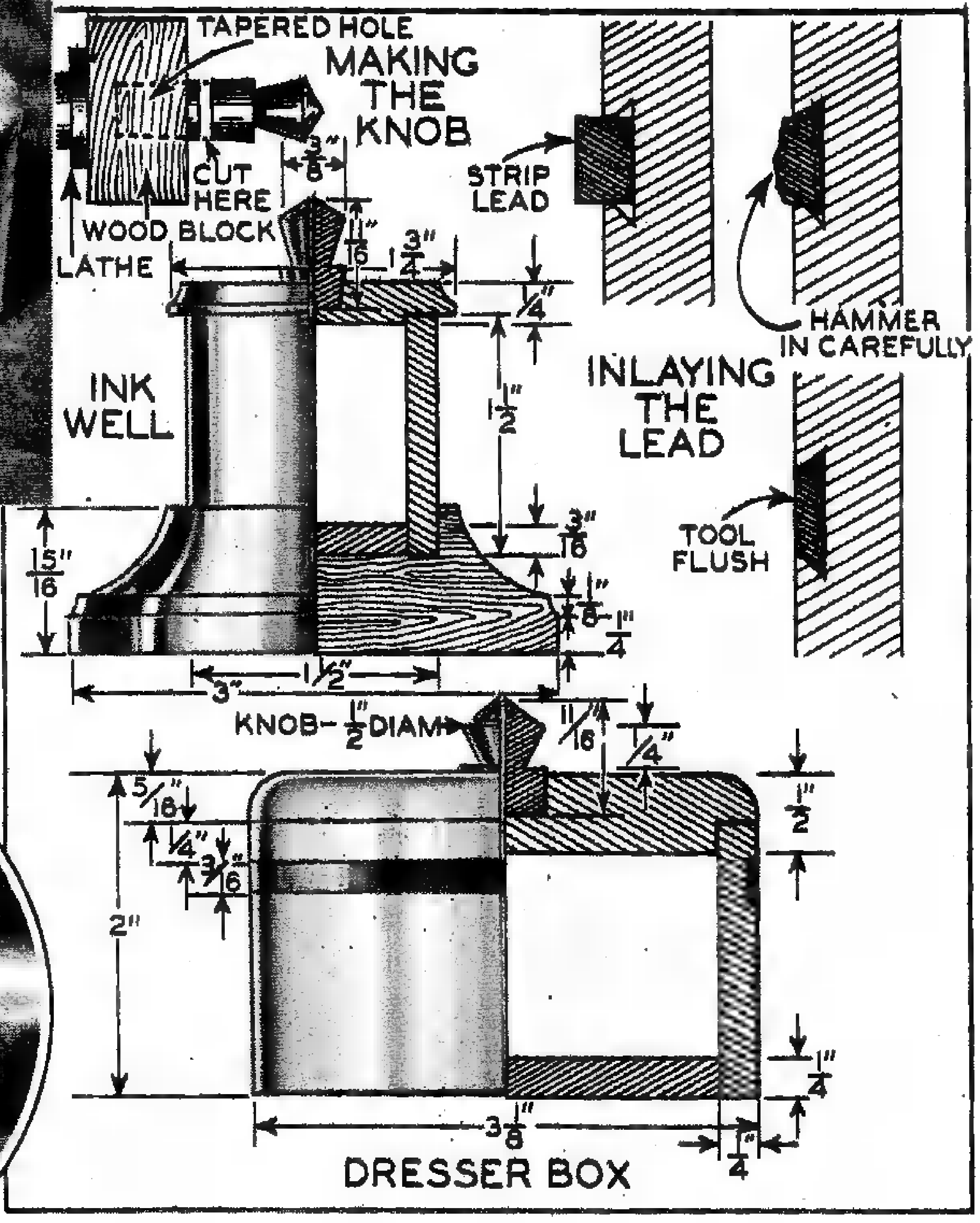
Phonographs, now worthless, make practical pieces of furniture at little or no expense.


BOOK OR WHAT-NOT SHELVES
SHELF AND PIGEON HOLE SPACE INSIDE HINGED SLANT TOP
VICTROLA TOP
OLD VICTROLA

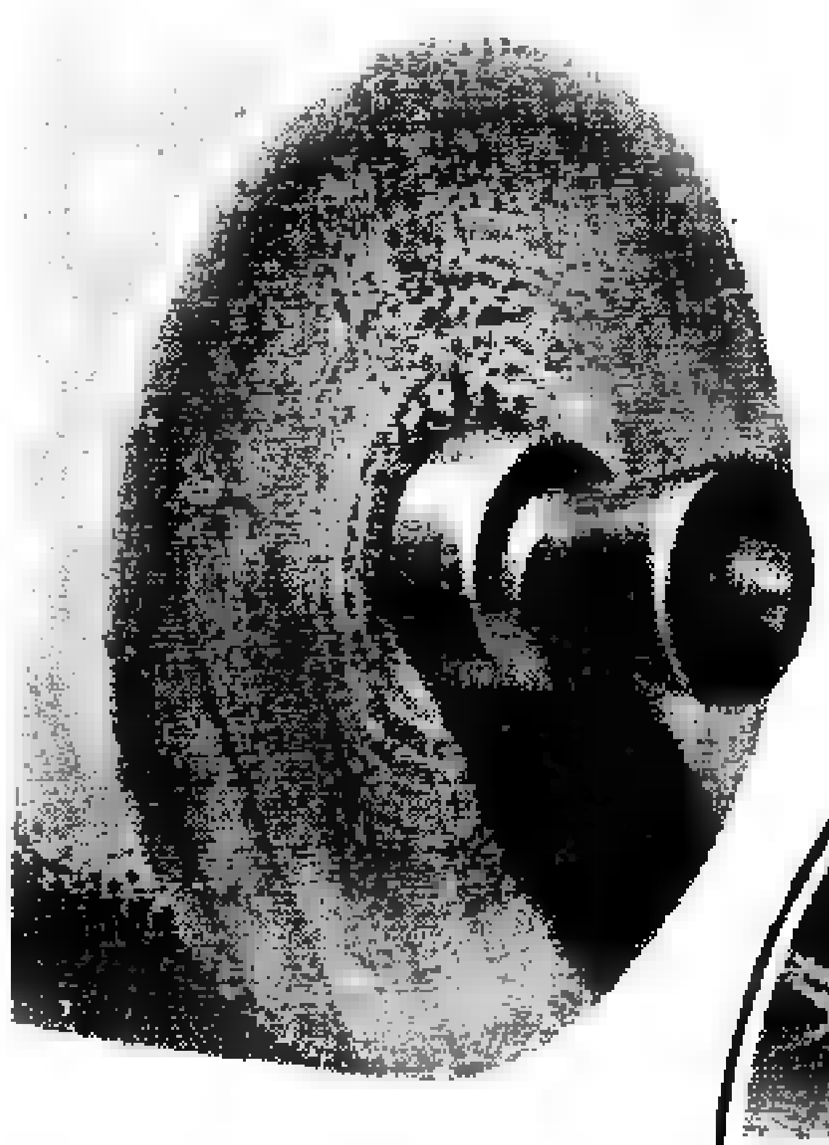
Make These NOVELTIES *with*

by Dale R. VanHorn

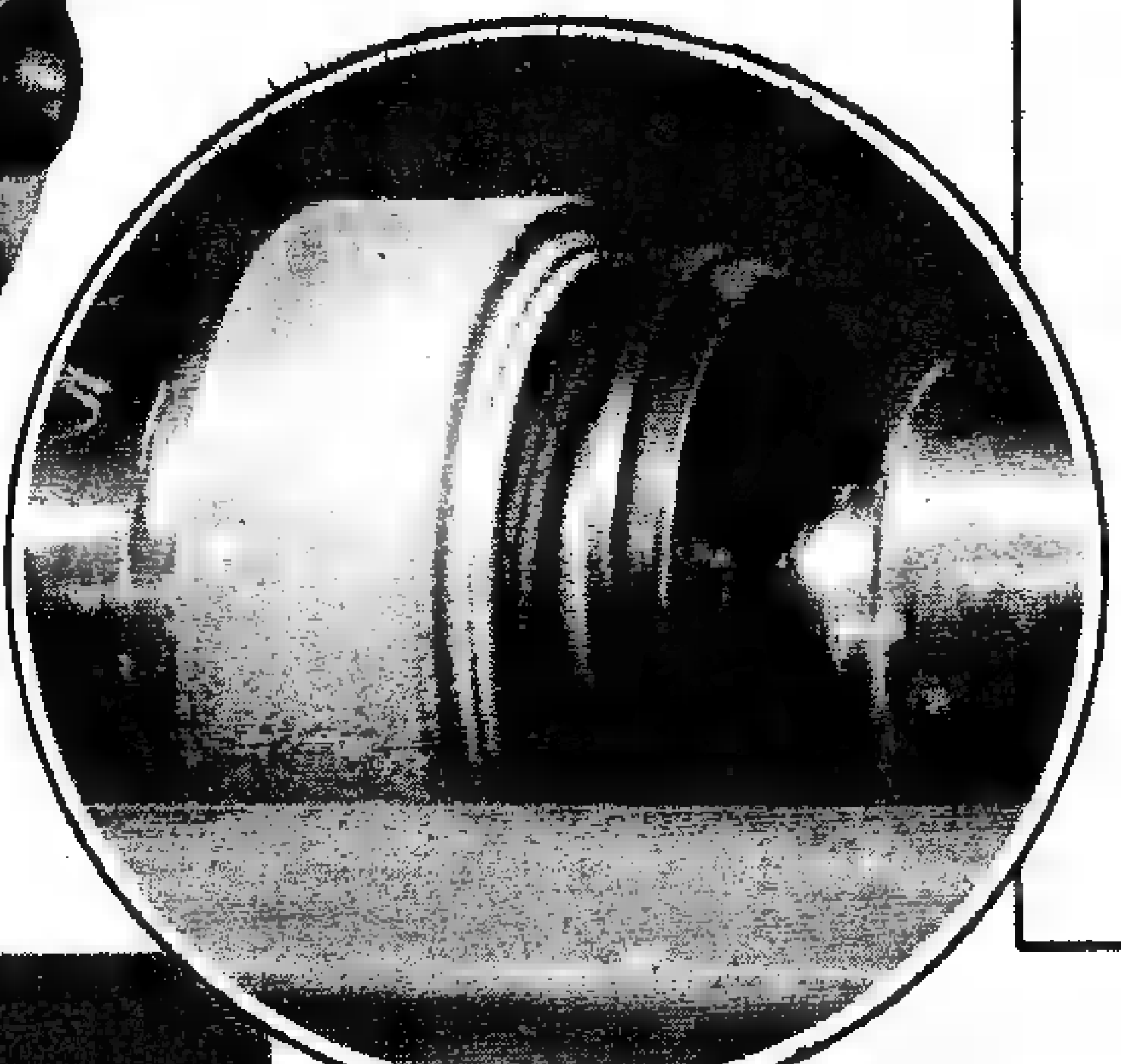
The attractive ink well and dresser box shown above were turned from colored plastics.

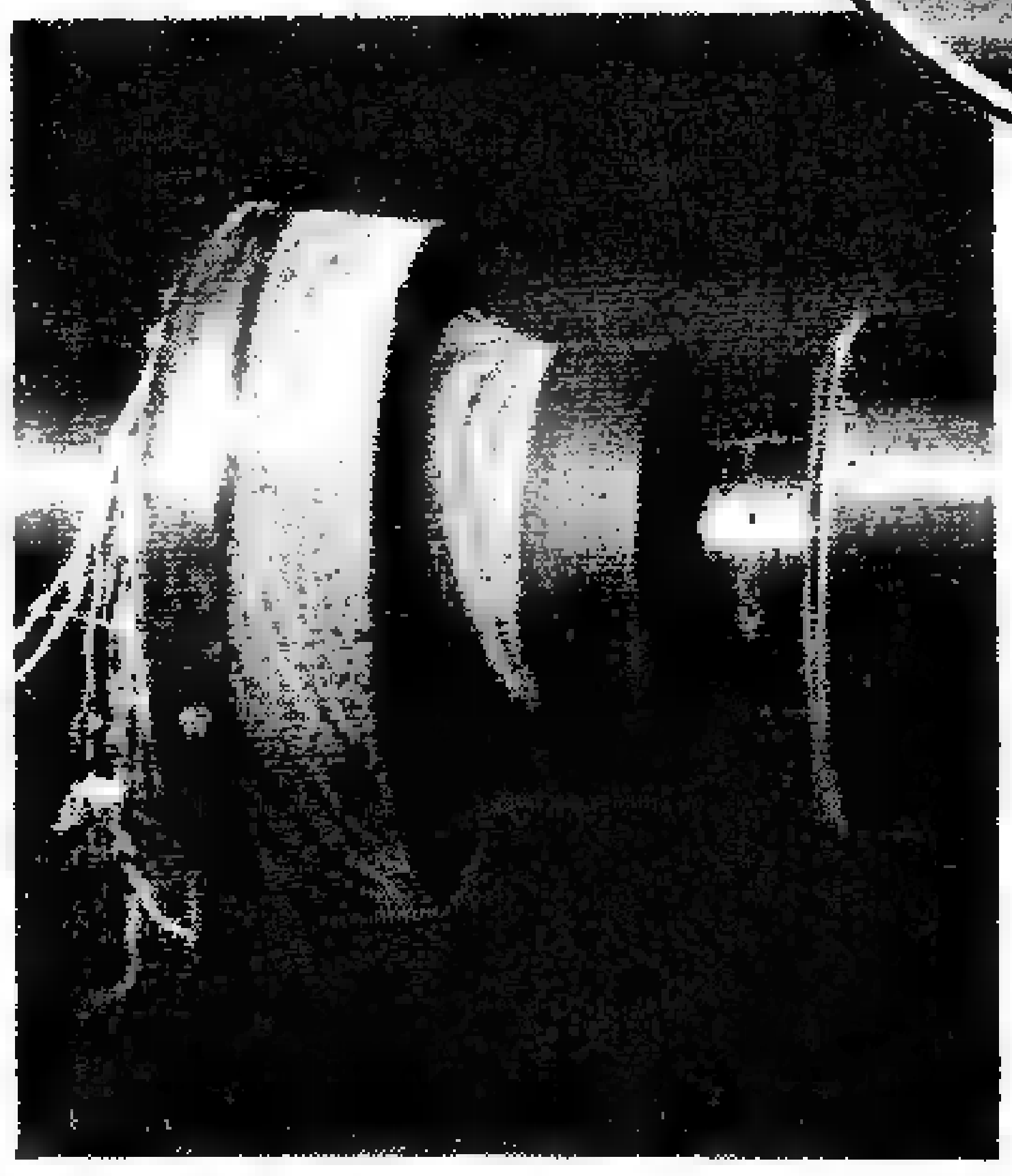

TAPERED HOLE
MAKING THE KNOB
CUT HERE
WOOD BLOCK
LATHE
3/8"
11/16"
1 3/4"
1/4"
STRIP LEAD
HAMMER IN CAREFULLY
INLAYING THE LEAD
TOOL FLUSH
INK WELL
1 1/2"
3/16"
15/16"
1/8"
1/4"
3"
1 1/2"
KNOB-1/2" DIAM
11/16
1/4"
5/16"
1/4"
3/16"
1/2"
2"
1/4"
3 1/8"
1/4"
DRESSER BOX

Dimensions for the inkstand and dresser box are all indicated in the above schematic drawing. Carefully note method used to keep lead inlay strips from becoming loose from turnings.

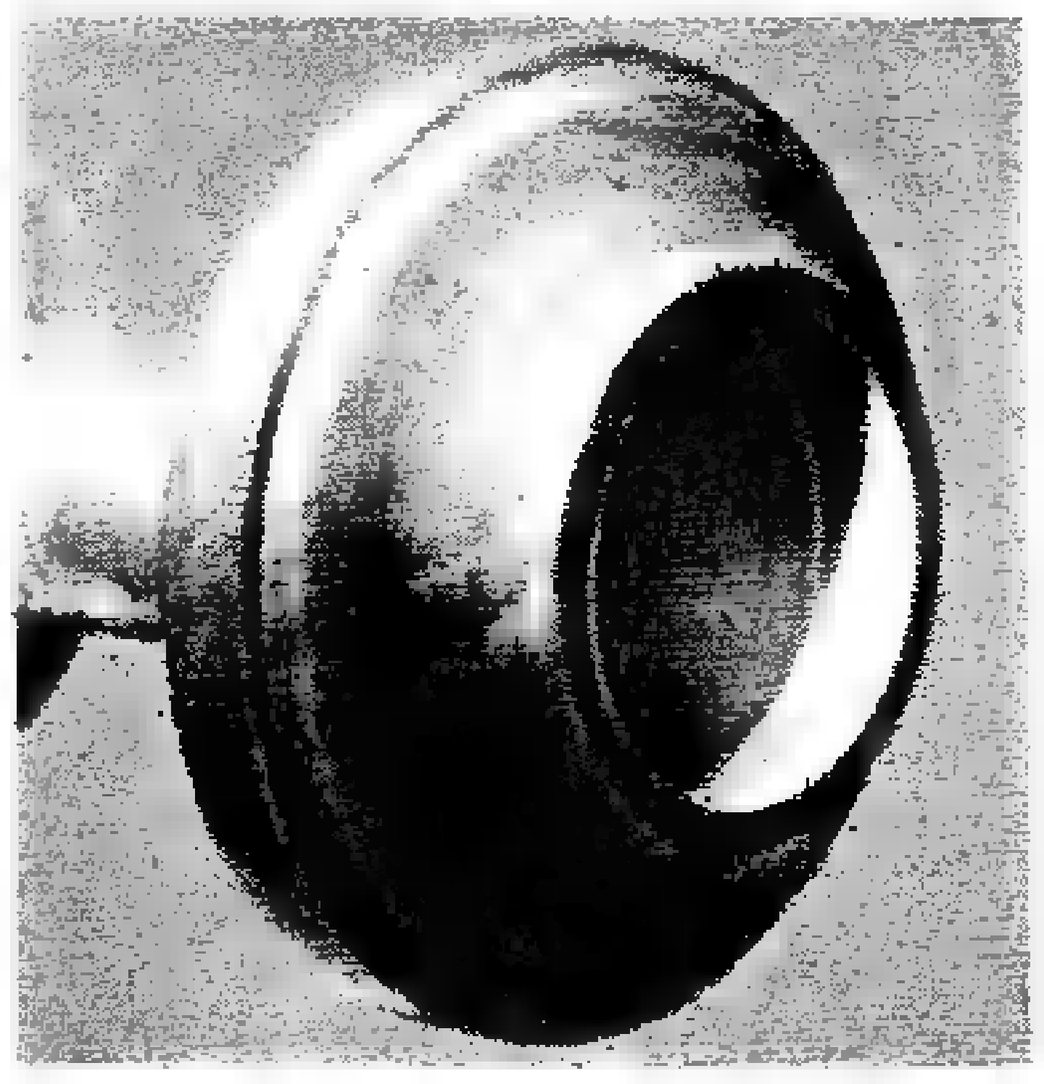


Form knobs by tapping short plastic rod into hole in block of wood and attach to the faceplate.

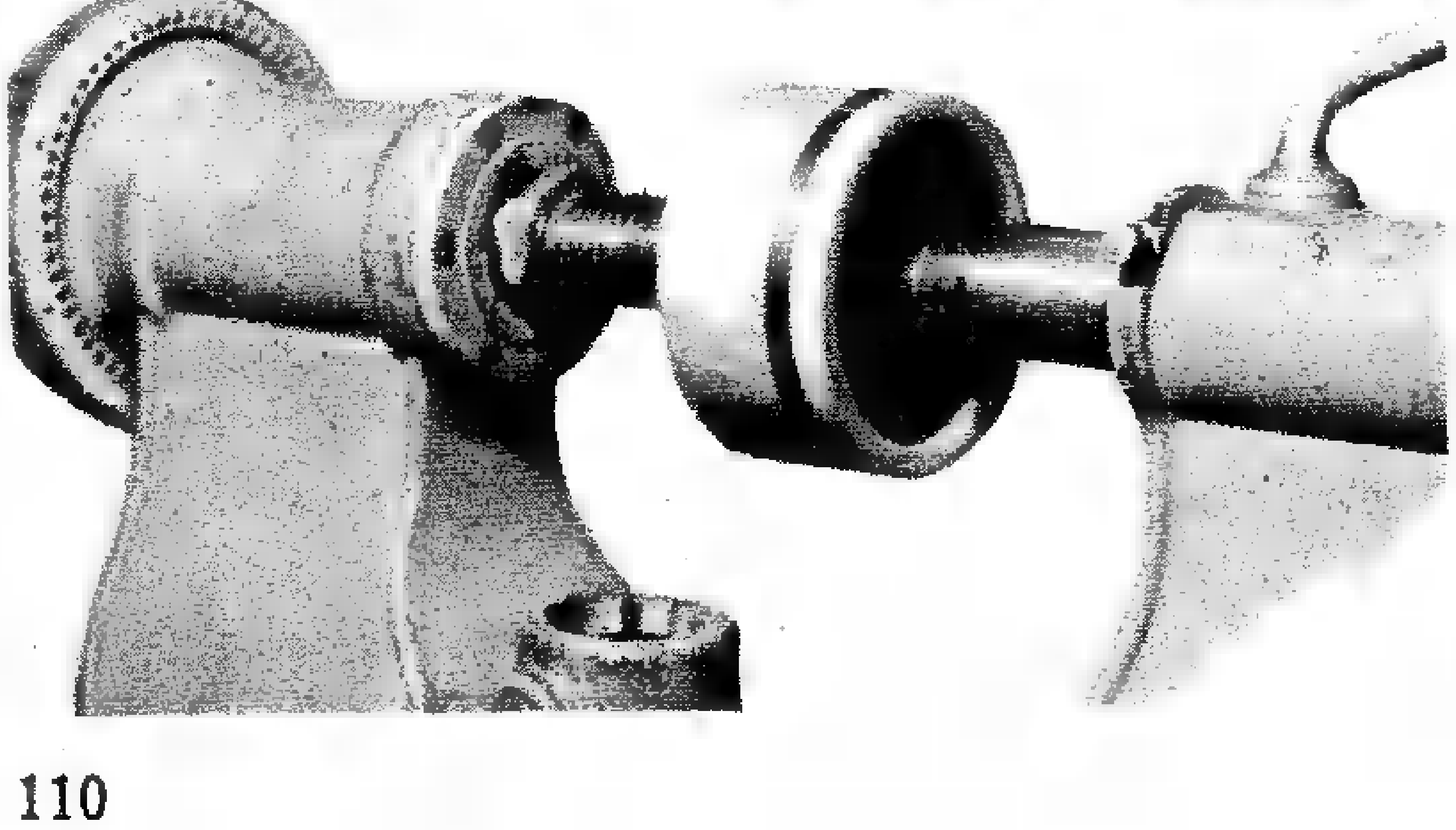




The base of the inkstand as it appears near its completion and below, looking into front of nearly completed inkstand.



Above—The walnut base of the ink stand mounted in the lathe. Below—the dresser box with the lead band inserted in the inlay groove.



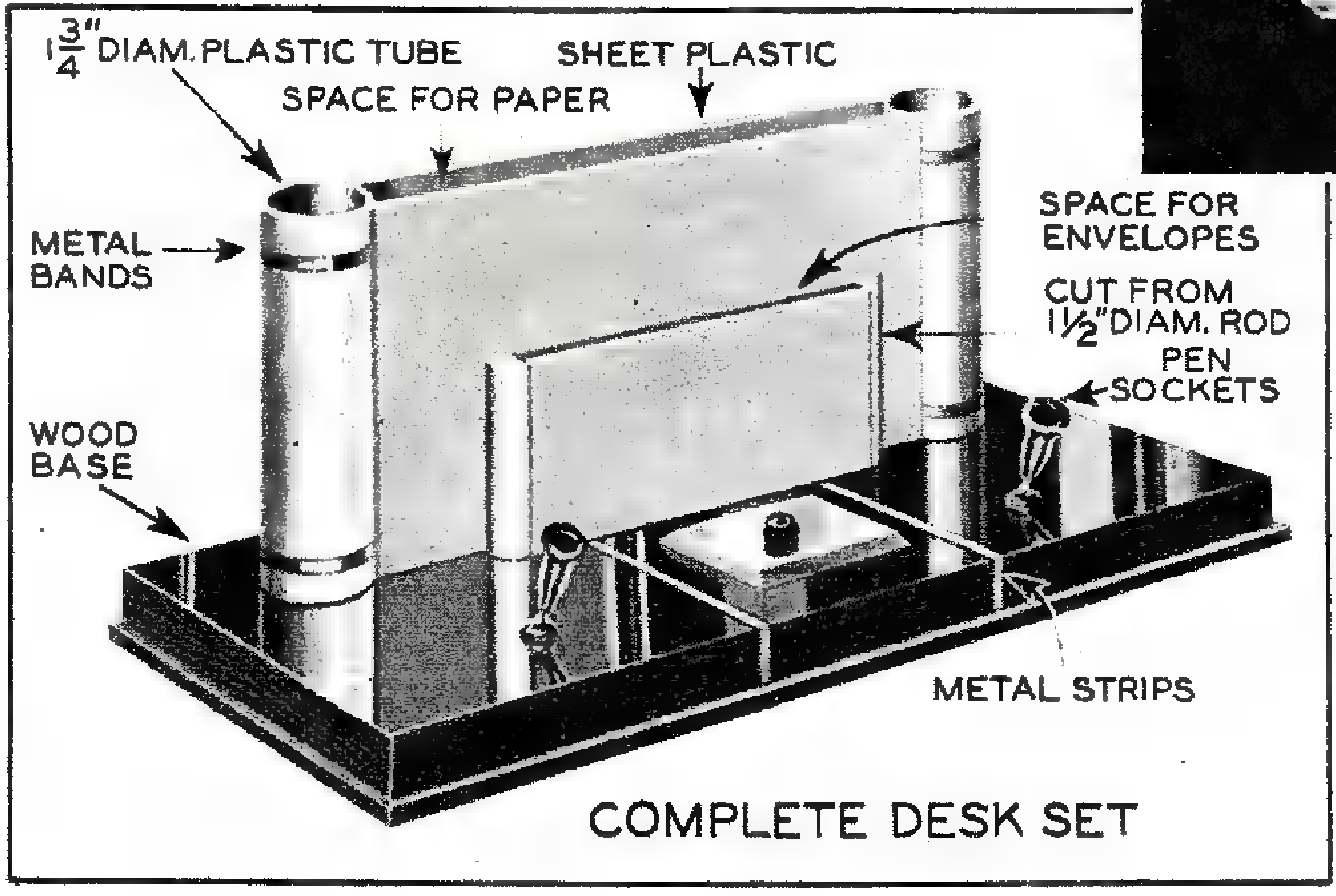
THE surprising adaptability of the new plastic materials and the striking results of the finished articles, makes them ideal for the home craftsman's turned projects.

Hard rubber, the first plastic, was confined to one color. Bakelite, the next important plastic discovery, was hard and it did not lend itself readily to easy manipulation in the home shop, but this new plastic can be worked like wood or soft metals, turned in the lathe, bent to shape in hot water, planed, drilled, filed or sanded, and takes a beautiful polish. Besides, every color of the rainbow are available.

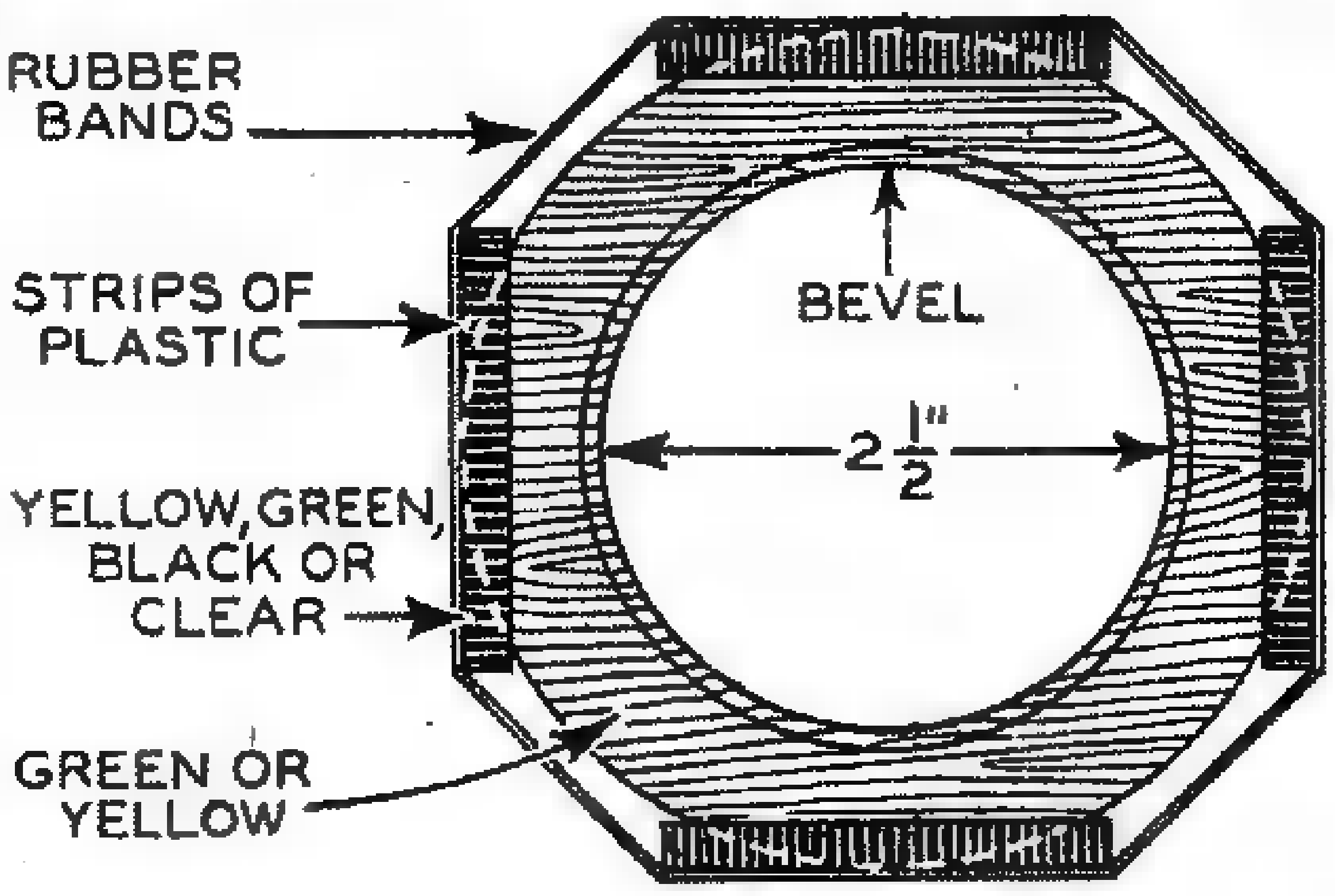
To get acquainted with it, simple projects naturally come first. A solid color bracelet requires only the obtaining of a short length of 2½-inch tube of the right color. Turn a wood spindle with a slight taper so that the plastic cube can be forced to a snug fit upon it. Then with the proper chisels, round the

Rainbow-Hued PLASTICS

Brilliant in color and as easy to work as wood, this new celluloid-like plastic material can be turned, cut or bent into attractive novelties. The projects described here are just a few of the many possible.



COMPLETE DESK SET



The desk set at left is not only attractive, but very easy to make. Simplest of all projects is the bracelet at right. Several layers of plastics provide designs that are as original as they are attractive in appearance.

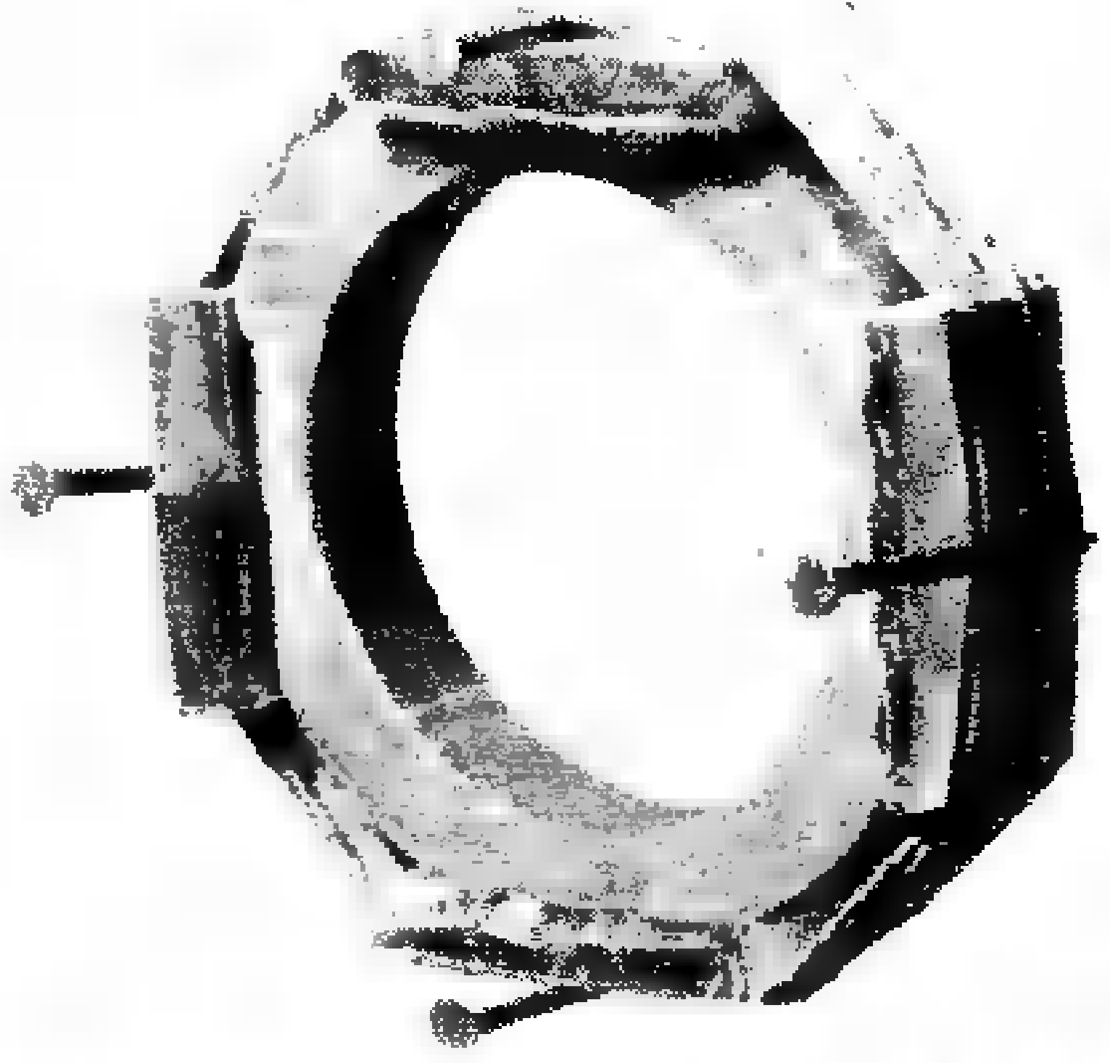
inner edges, round the outside surface to the desired design, and polish. A variation consists of sanding four flat sides, evenly spaced and cementing strips of a contrasting color to these flat areas, using rubber bands to hold them in place until the cement has dried after which the ring is turned down on the lathe. Suggested color combinations are: yellow ring with green or black segments, green ring with yellow or black segments, black ring with yellow or orange segments.

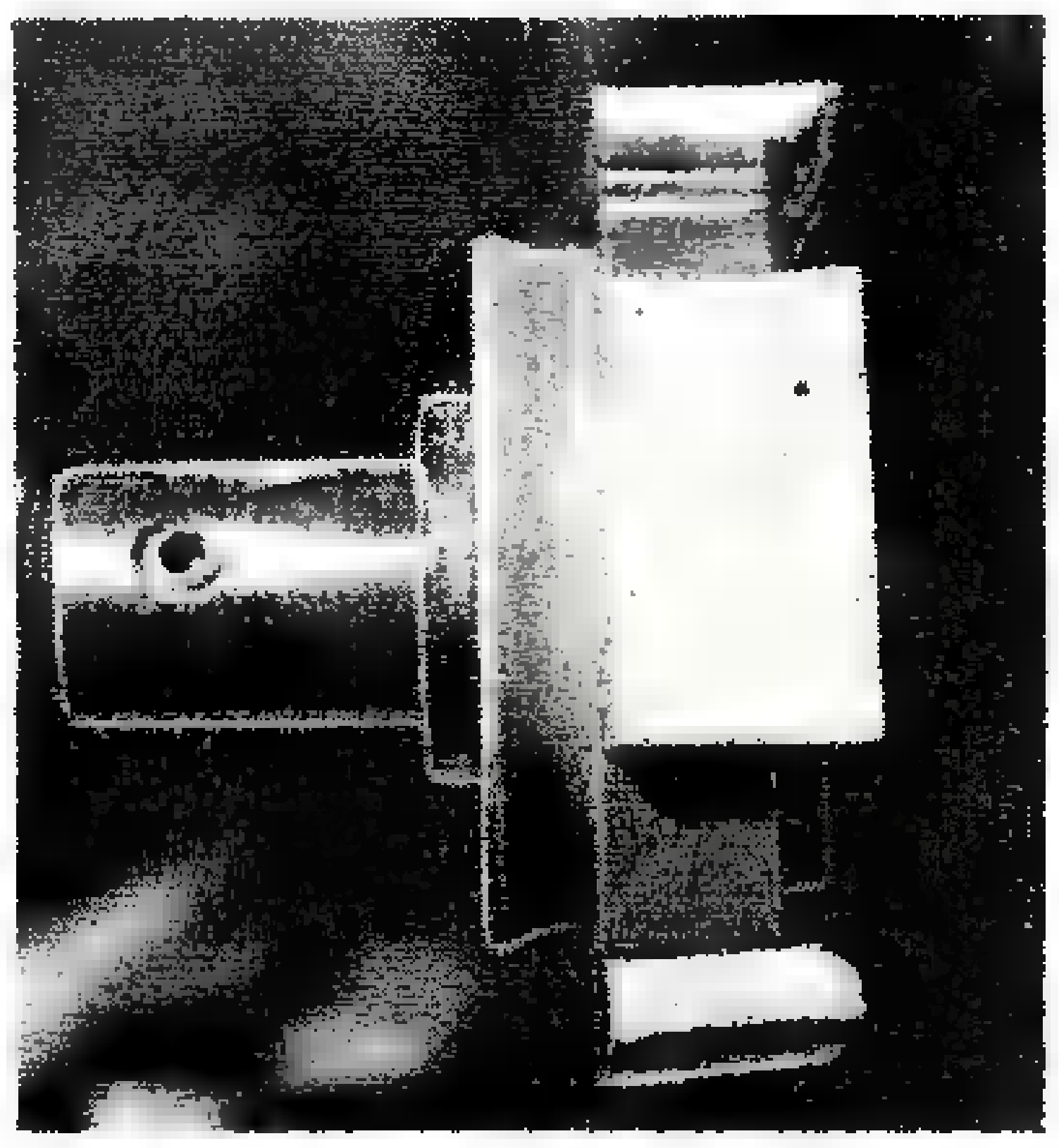
An attractive ink well which harmonizes almost anywhere can be made with a small block of walnut, a tube and a small piece of flat plastic. Turn the base to 3 inches in diameter of the design shown and sand, fill and finish with clear lacquer or shellac. Turn the center depression just large enough to take the plastic tube, to a depth of about 5/16-inch. Felt should be glued to the base and the edges trimmed.

Turn a wood spindle to make a tapered fit for the plastic tube, work it on to a tight fit, and true up the ends, with a length of 1½ inches. The outside can be also trued with a chisel, then the polishing wax applied with a rag to give a lustre.

The bottom can be any thin flat plastic. It is turned between two blocks of wood in the lathe whose diameters are that of the inside diameter of the tube. One block is centered with the tail stock, the other with the live center. To prevent the flat piece from working out of alignment, drive two short brads in the exact centers of the adjoining ends of the spindle and file them to sharp, short points. The flat piece is then placed between them and the dead center worked up snug

[*Continued on page* 122]





Nails driven into a block of wood attached to the lathe's faceplate will permit turning.

THE FINISHED BRACELET

Electric Magic Box for Amateur Magicians

THIS novel electrically operated magic stunt will add life to any party and make you the center of attention. Ask a guest to place a coin in any one of the three holes in the "Black Chamber Box" while you turn your back. Although the lid is closed you can, without fail, tell them in which one of the holes the coin lies.

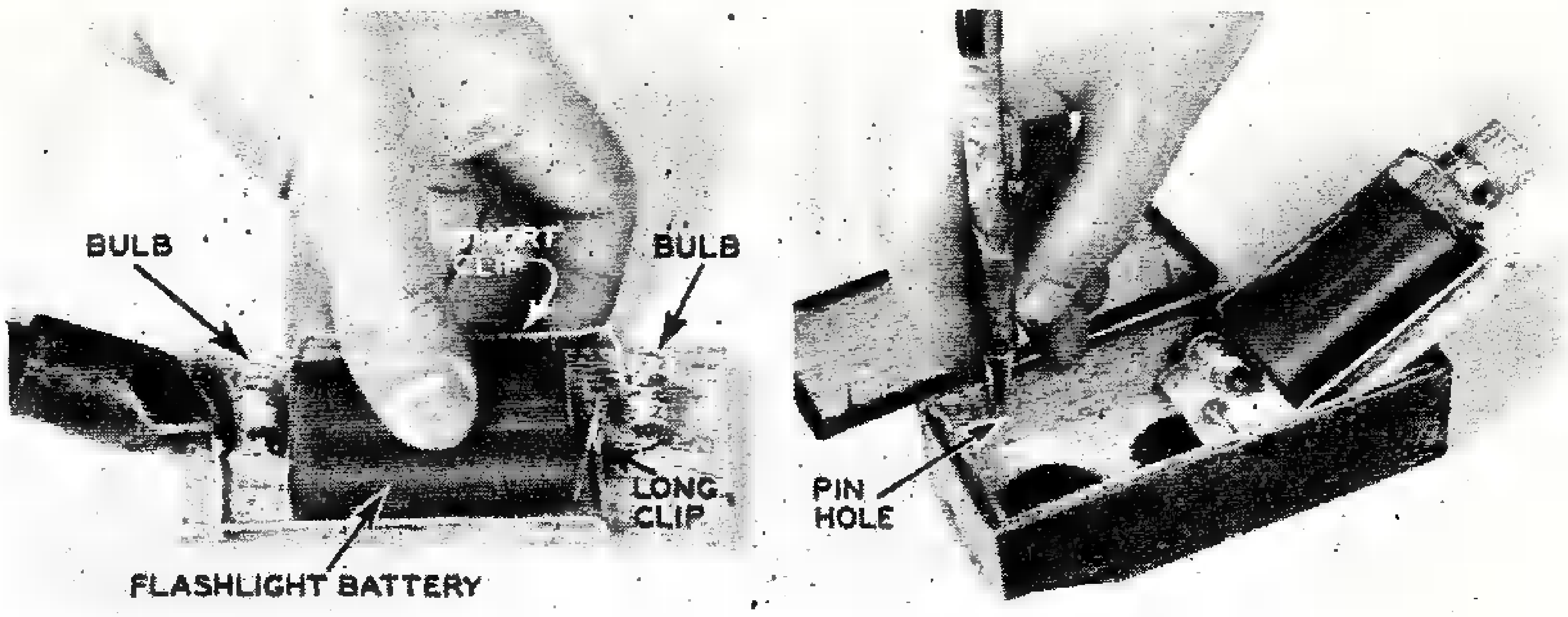
The box is made from cigar box wood and is 4¾"x2"x1⅜" in size. Three holes are cut into the top of the box just large enough to take a 10-cent piece. In each of the end holes force a pair of contact pins, one pin in the center and the other against the edge of the hole. In the center hole place a single pin. This is merely added to avoid suspicion.

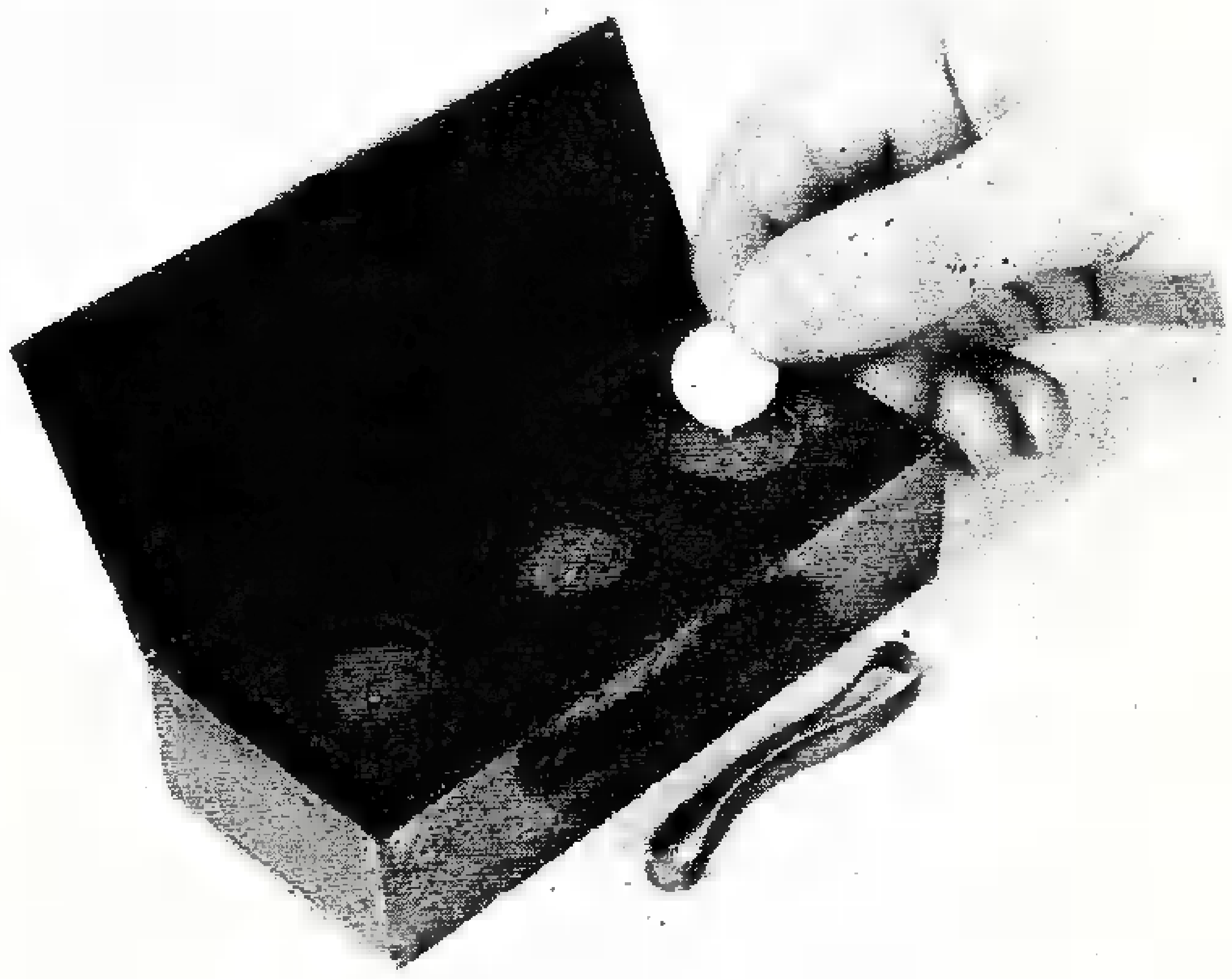
To the back of the top attach a vestpocket flashlight battery wiring up the center pins to the tips of two flashlight bulbs. The brass base of the bulbs are attached to a length of heavy wire which in turn is soldered to the short brass clip on the battery. Connect another heavy wire to the two pins remaining and solder this wire to the long clip on the battery.

Insert the unit in the box noting the location of the bulbs. In the side of the box opposite bulbs punch two small pin holes. Assemble the box, paint in mottled finish and trick is ready to perform. The secret is simple. When coin is placed in either of the end holes circuit is completed and lamp goes on. The light showing through pinholes tells you at once in which hole the coin has been placed. If there is no light shining through either of the pin holes the coin is, of course, in the center slot.

The contact pins are ordinary straight pins which are cut off after being pushed through the box. All connections should be well soldered to insure successful operation of the "Black Chamber Box." After completing the device and getting it to operate satisfactorily check joints for possible light leaks as they would give away the secret.

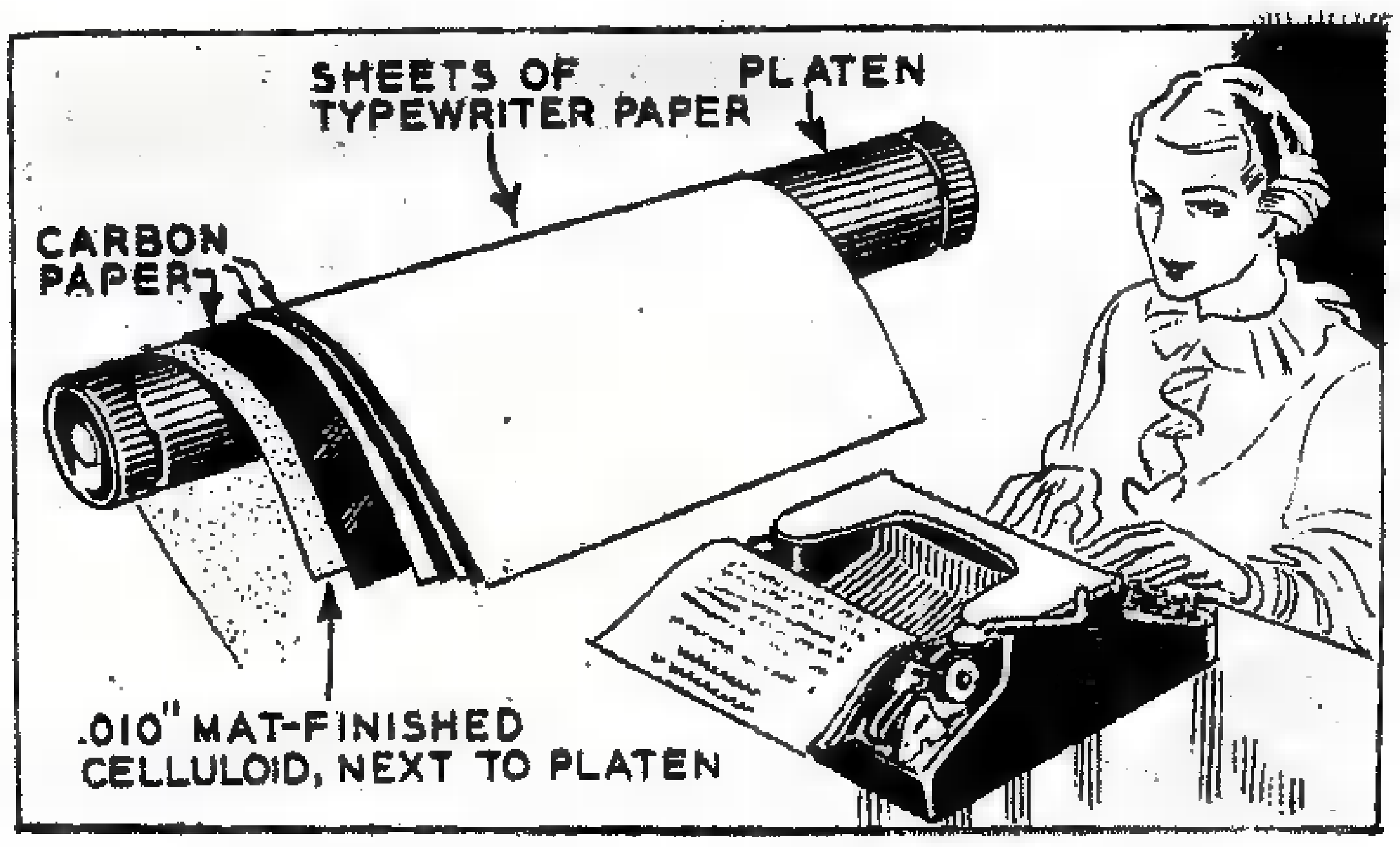
The mottled finish on the box prevents the small pinholes from being detected by the person hiding the coin. The many ways in which this stunt can be performed are far too numerous to mention.





Wire the "Black Chamber Box" in the manner shown above. Use heavy wire for supporting flashlight bulbs and solder all connections well. Battery is glued to back of wood panel.

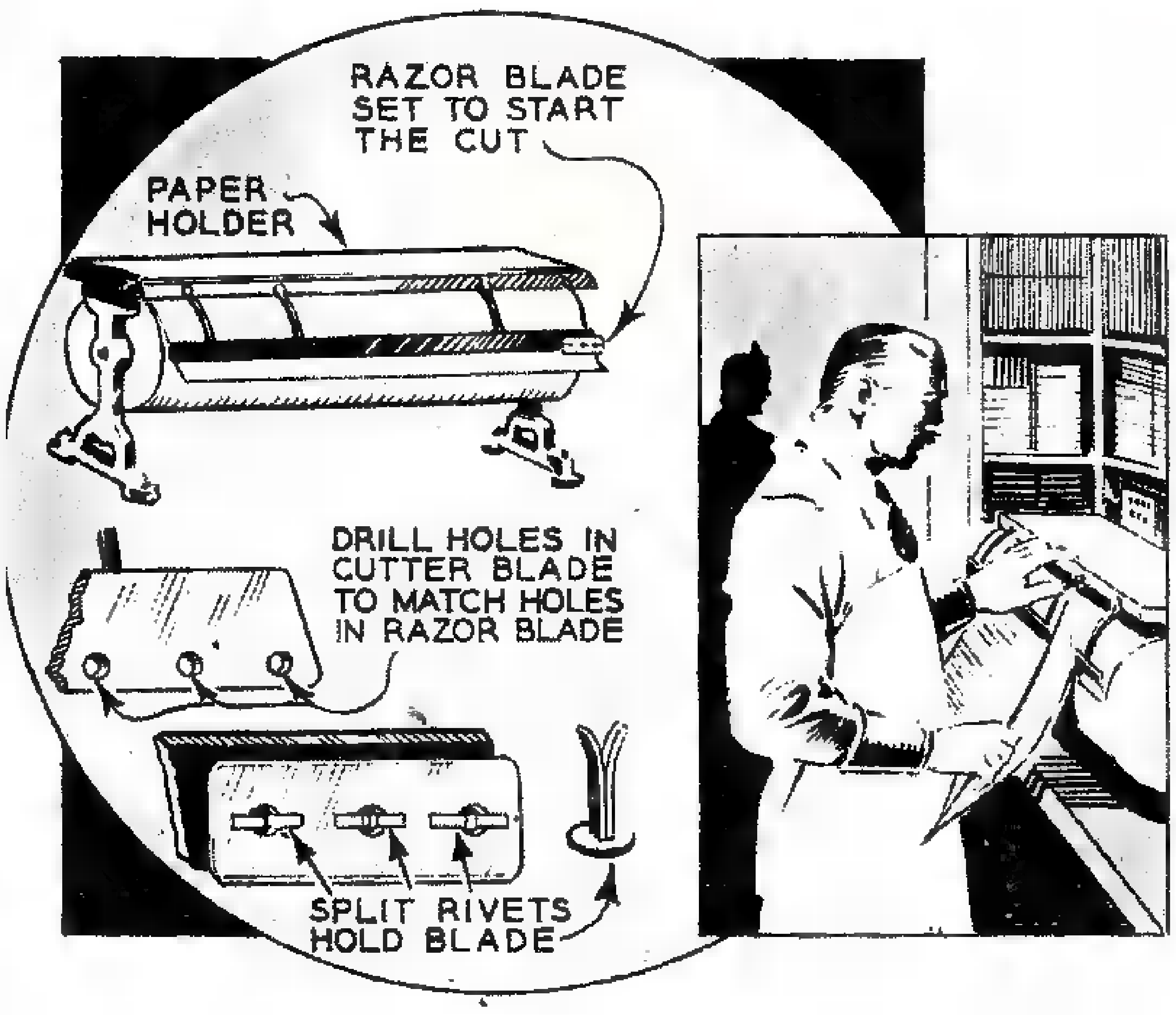
Celluloid Improves Carbon Copies


SHEETS OF TYPEWRITER PAPER
PLATEN
CARBON PAPER
.010" MAT-FINISHED CELLULOID, NEXT TO PLATEN

A sheet of very thin mat finished sheet celluloid, inserted in the typewriter according to the above illustration, makes it possible to cut six or more clear carbon copies at one time.

VERY often when a number of copies of an article are desired carbon copies are made. Usually only the first two copies come out clear, the others being either blurred or very difficult to read. A simple way to correct this is to place a sheet of .01" mat finished celluloid on the bottom of the papers then insert in typewriter and type in usual manner.

IDEAS FOR HOME AND BUSINESS


RAZOR BLADE SET TO START THE CUT
PAPER HOLDER
DRILL HOLES IN CUTTER BLADE TO MATCH HOLES IN RAZOR BLADE
SPLIT RIVETS HOLD BLADE

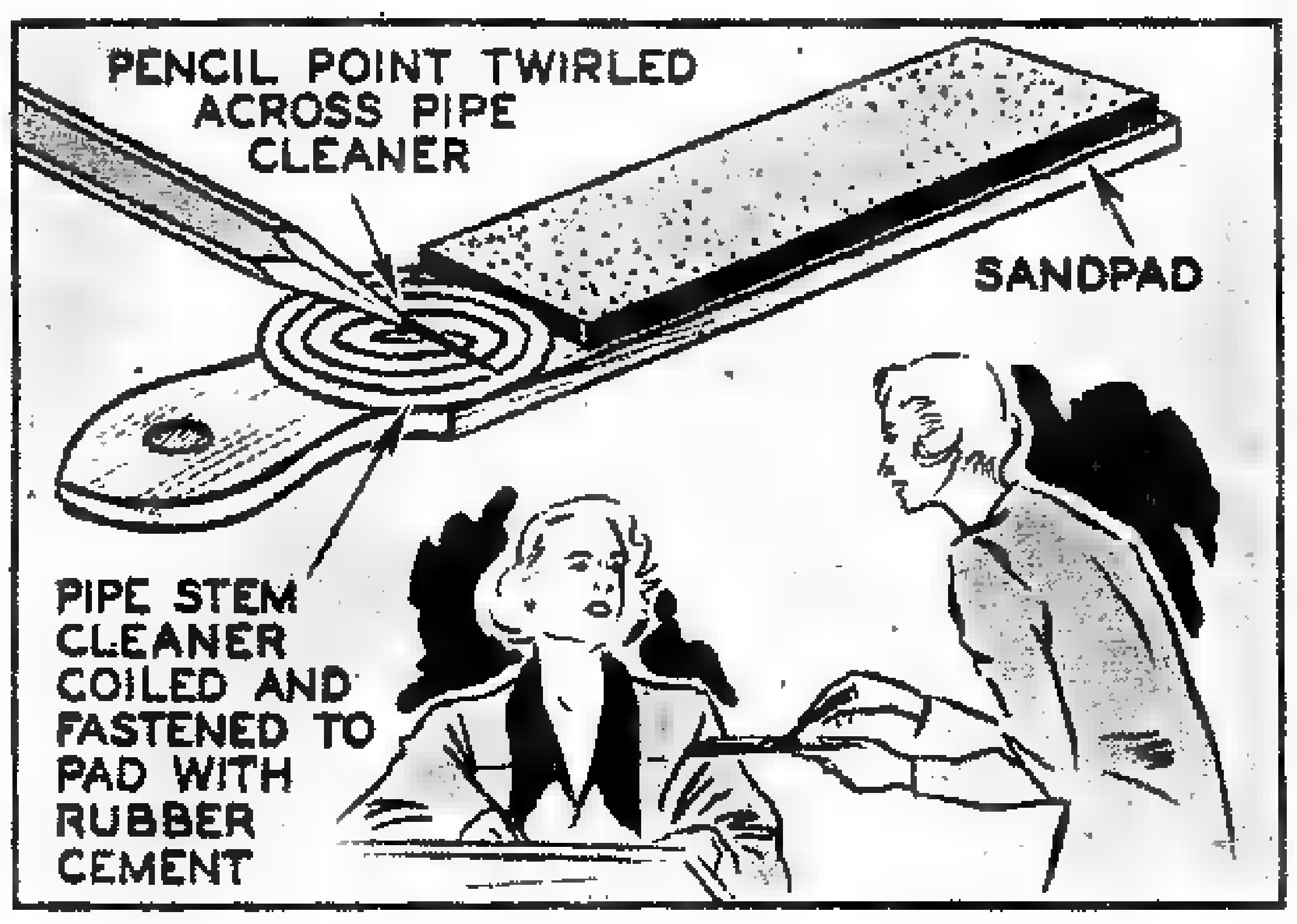
Razor Blades Aid In Tearing Paper

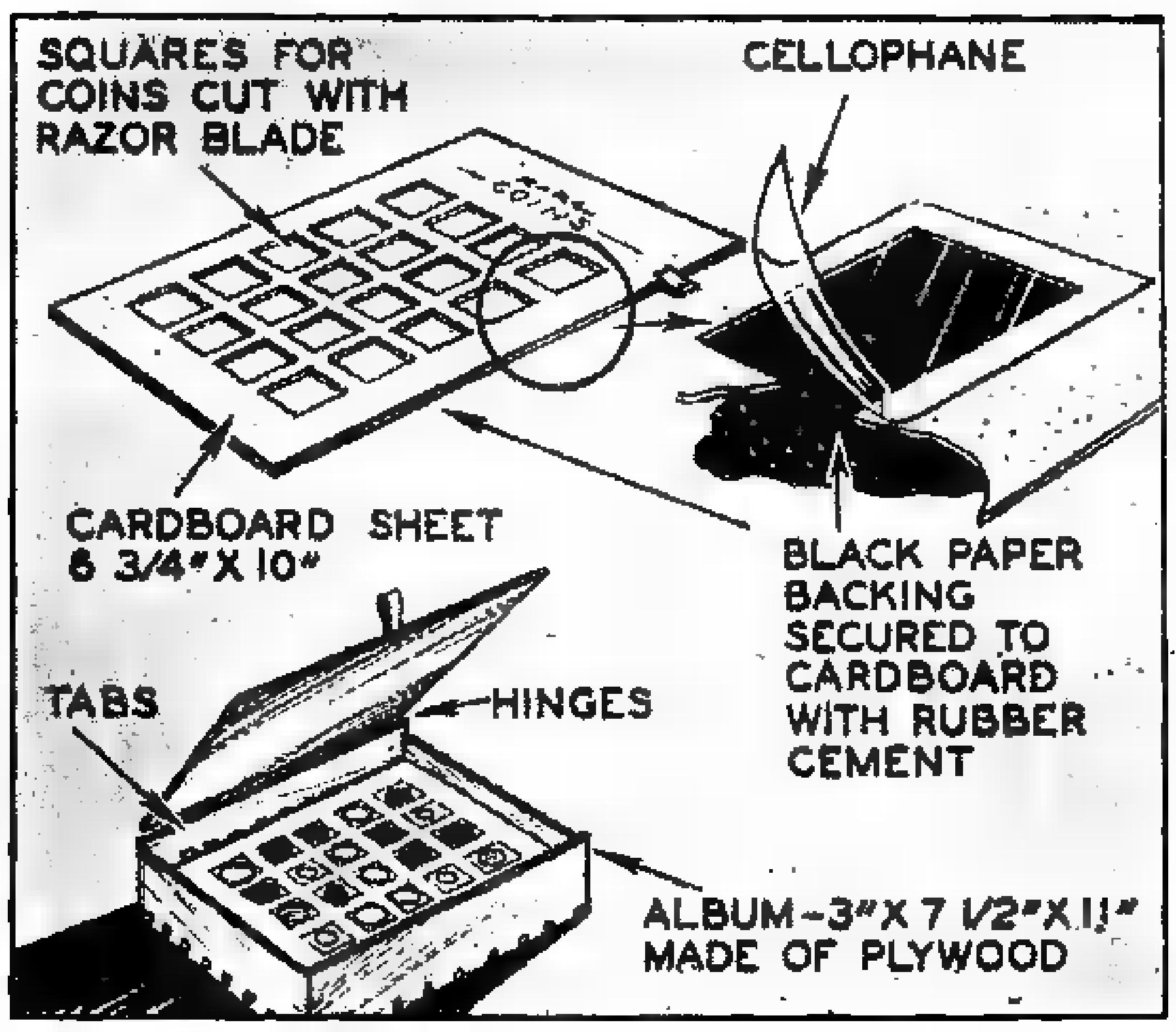
MERCHANTS having trouble in tearing off wrapping paper from the roll, especially if it is heavy stock, will find this simple suggestion very practical.

Drill three holes in the end of the present blade of your roll paper cutter spaced so that an ordinary safety razor blade may be fastened in place. The blade is attached to the paper cutter with either split rivets or flat head machine screws. It is important that the blade is rigid if it is to make quick clean tears. When a length of paper is desired simply unroll to desired length and give it a sharp pull.—Ralph Behm.

Sandboard Puts Sharp, Clean Point On Pencils

ARTISTS as well as the average person will find this simple pencil sharpener very convenient for keeping pencil points unusually sharp. Attach a piece of fine sandpaper to a plywood handle and underneath attach a coiled pipe cleaner using rubber cement to hold it in place. Sharpen pencils on sandpaper then twirl across pipe cleaner to remove lead dust.—Wm. Wagner.


PENCIL POINT TWIRLED ACROSS PIPE CLEANER
SANDPAD
PIPE STEM CLEANER COILED AND FASTENED TO PAD WITH RUBBER CEMENT


SQUARES FOR COINS CUT WITH RAZOR BLADE
CELLOPHANE
CARDBOARD SHEET 6 3/4"X 10"
BLACK PAPER BACKING SECURED TO CARDBOARD WITH RUBBER CEMENT
TABS
HINGES
ALBUM-3"X 7 1/2"X 11" MADE OF PLYWOOD

A Practical Coin Album for the Hobby Fan

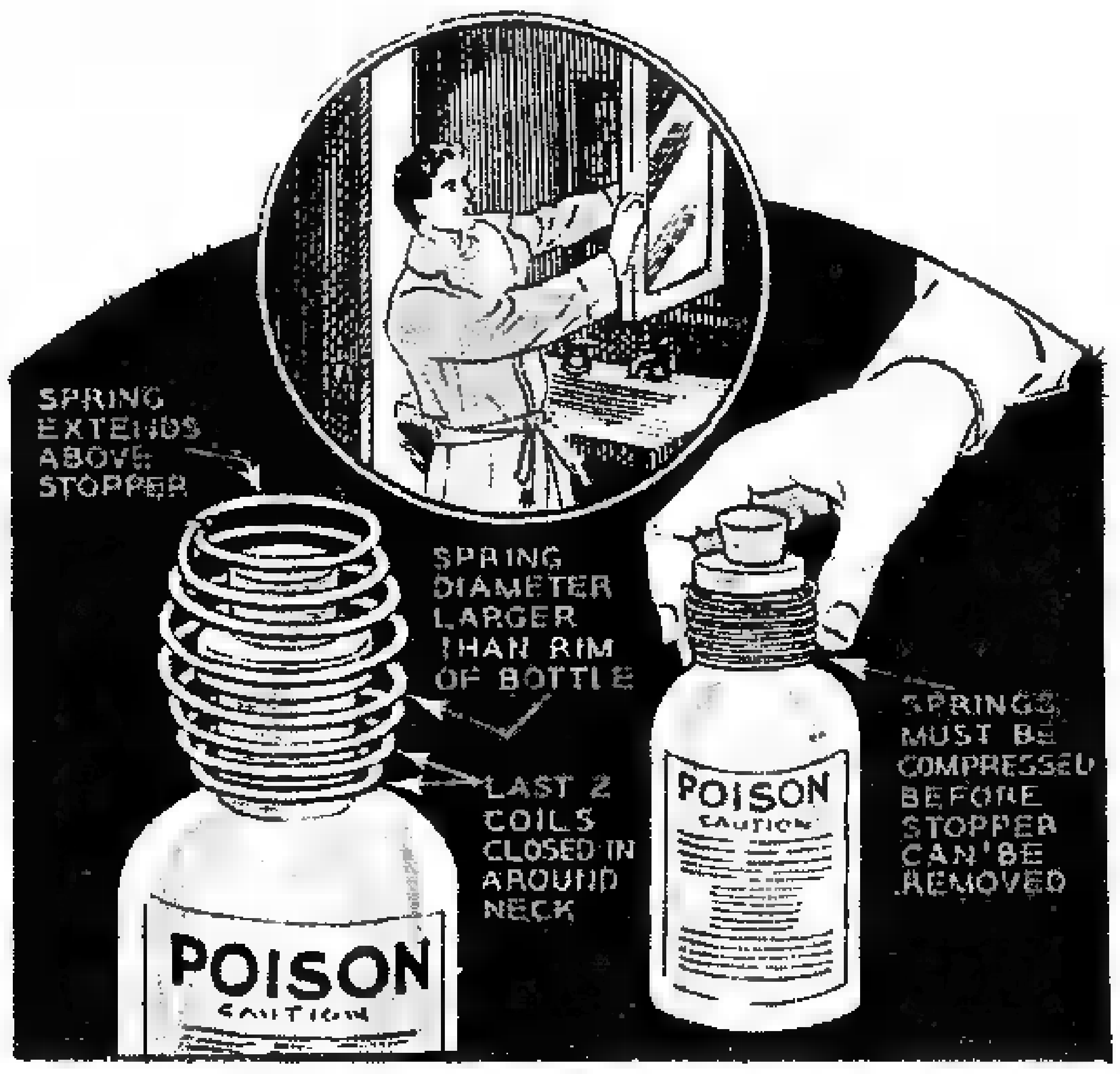
COIN collectors will find this coin album the ideal thing for displaying their hobby as the various coins may be viewed through cellophane without the danger of being lost.

Cut sheets of cardboard just large enough to fit inside the plywood box then cut out the coin recess squares with a sharp razor blade or pen knife. On the bottom of the cardboard sheets attach black paper backing so as to show off the coins well. Insert the coins in the squares and over them cement a sheet of cellophane.—V. Horn.

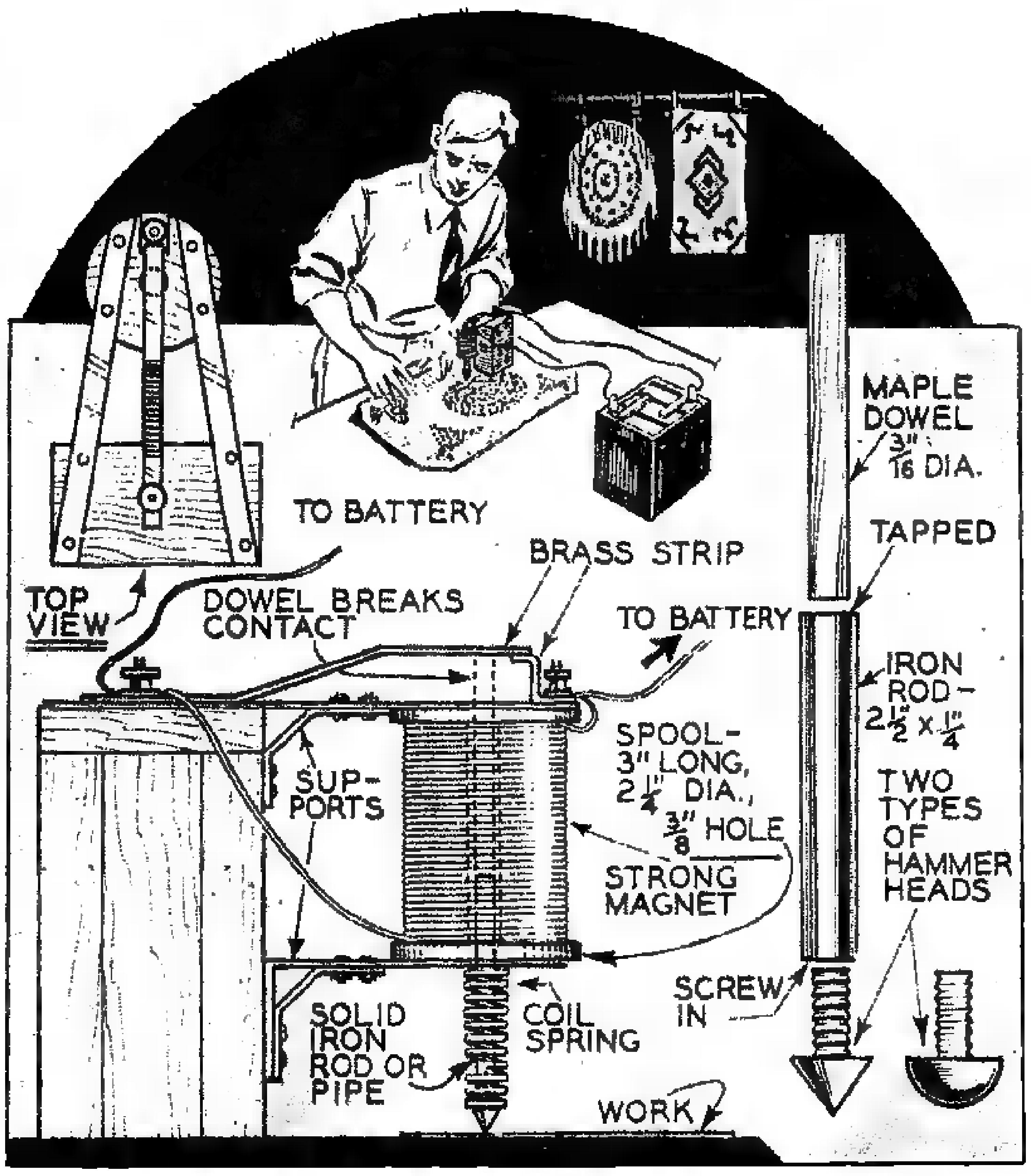
Spring Coils Identify Drug Bottles

BOTTLES containing poisons or other dangerous solutions are very often accidently mistaken in the dark as being medicines and when taken internally lead to serious illness. This danger can be avoided by attaching springs over the necks of all bottles containing harmful liquids. Wind the spring with brass wire then slip over the neck of the bottle and draw the last two coils tight so that the spring cannot accidentally come off.

It is impossible then to remove the contents from the bottle without first compressing the spring. This kink will also prevent small children from opening bottles which may contain harmful drugs.—Wm. Hertwig, Jr.


SPRING EXTENDS ABOVE STOPPER
SPRING DIAMETER LARGER THAN RIM OF BOTTLE
LAST 2 COILS CLOSED IN AROUND NECK
SPRINGS MUST BE COMPRESSED BEFORE STOPPER CAN'BE REMOVED
POISON
CAUTION
POISON
CAUTION

Electric Hammer Applies Attractive Designs To Metal


MAPLE DOWEL $\frac{3}{16}$" DIA.
TO BATTERY
TAPPED
BRASS STRIP
TOP VIEW
DOWEL BREAKS CONTACT
TO BATTERY
IRON ROD– $2\frac{1}{2}$" x $\frac{1}{4}$"
SPOOL– 3" LONG, $2\frac{1}{4}$" DIA., $\frac{3}{8}$" HOLE
SUP-PORTS
TWO TYPES OF HAMMER HEADS
STRONG MAGNET
SCREW IN
SOLID IRON ROD OR PIPE
COIL SPRING
WORK

Attractive designs traced upon sheet copper, lead or other soft metals can be formed into attractive hammered metal projects through the use of this easily made electro-hammer.

WITH this electric hammer you can make attractive hammered metal ash trays, coasters, and other useful articles in only a fraction of the time usually required to do the work by hand. The tool, which is connected to either a six-volt battery or door bell transformer, is constructed from a minimum amount of parts and simple enough for anyone to make.

Secure a spool approximately 3 inches long and 2¼ inches wide and on it wind about 15 layers of No. 16 enameled wire until the coil is flush with the ends of the spool. The hole in the spool is just large enough to pass a ¼-inch iron rod about 2½ inches long. Drill holes in each end of the rod to take the hammer heads and a length of maple dowel.

Mount the spool on a suitable block of wood with brass brackets. Next make the spring contact from a strip of brass according to the illustration so that it will normally be closed, but will be momentarily opened each time current passes through the coil. This action is caused by the solenoid coil drawing up the iron rod to which is attached the maple dowel rod.

A spring of medium tension inserted between the magnet and hammer head drives the tool against the work.

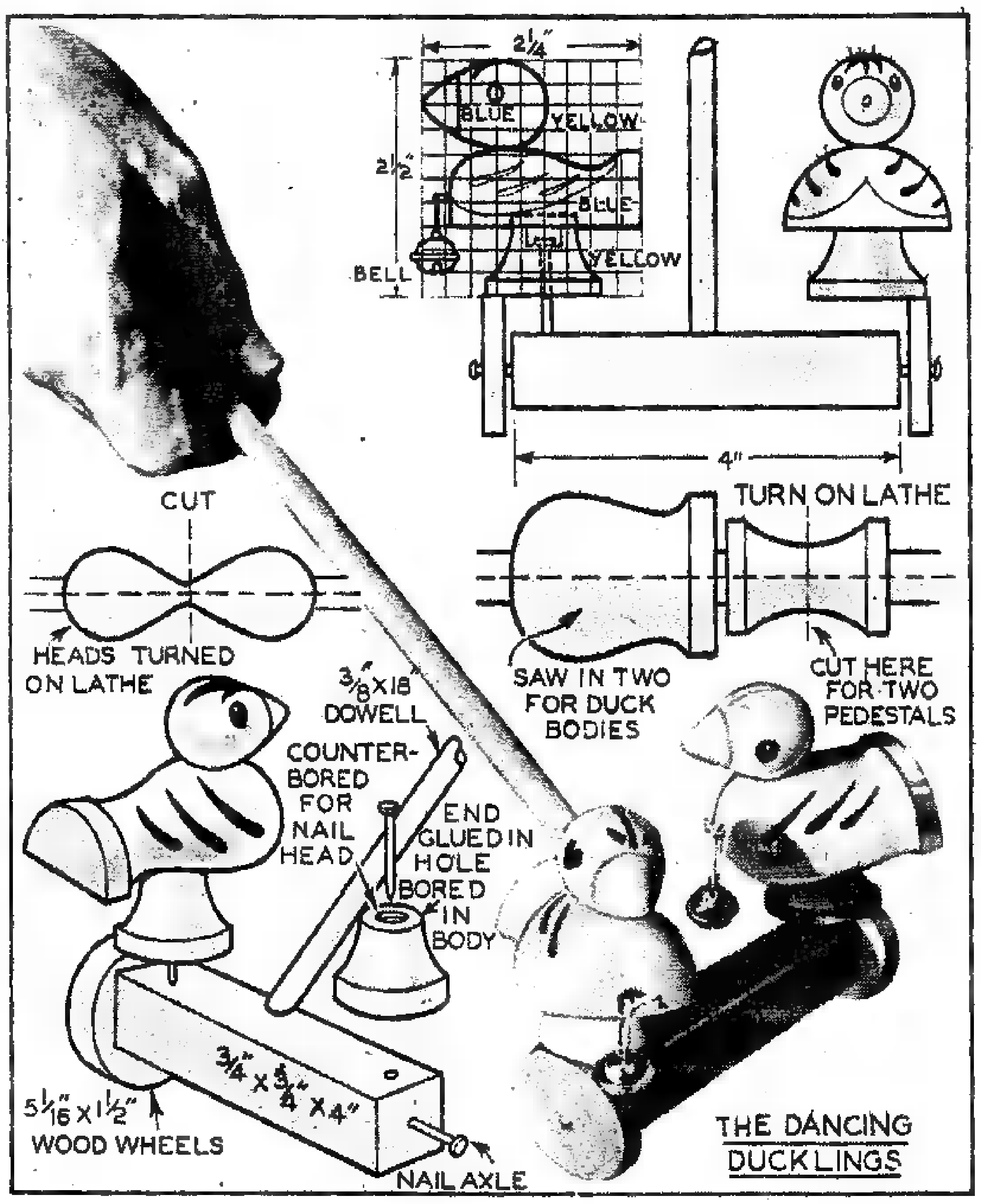
"Dancing Ducks" Easily Made Toy

THIS ingenious toy, a new idea from the Orient, can easily be constructed by the amateur or professional woodworker in less than one hour. When pushed along the sidewalk the twin ducks whirl around, jingling their bells merrily.

The carriage is a simple wooden axle ¾-inch by ¾-inch by 4 inches long to which is attached two wheels 1½ inches in diameter. These are cut from round stock or sawed out of flat stock on jig saw. Nails driven into the ends of the carriage block serve as axles for the wheels.

The heads and bodies of the ducks are carved or turned on a lathe to the shape indicated in the drawings. When finished the pedestals are cut in half forming the upper and lower parts of the bodies for the two birds. The one part of the body fits into the other and the whole assembly revolves on a nail driven into each end of the carriage. After the ducks have been completed attach an 18-inch length of ⅜-inch wooden dowel to the carriage so that the child can push it easily.

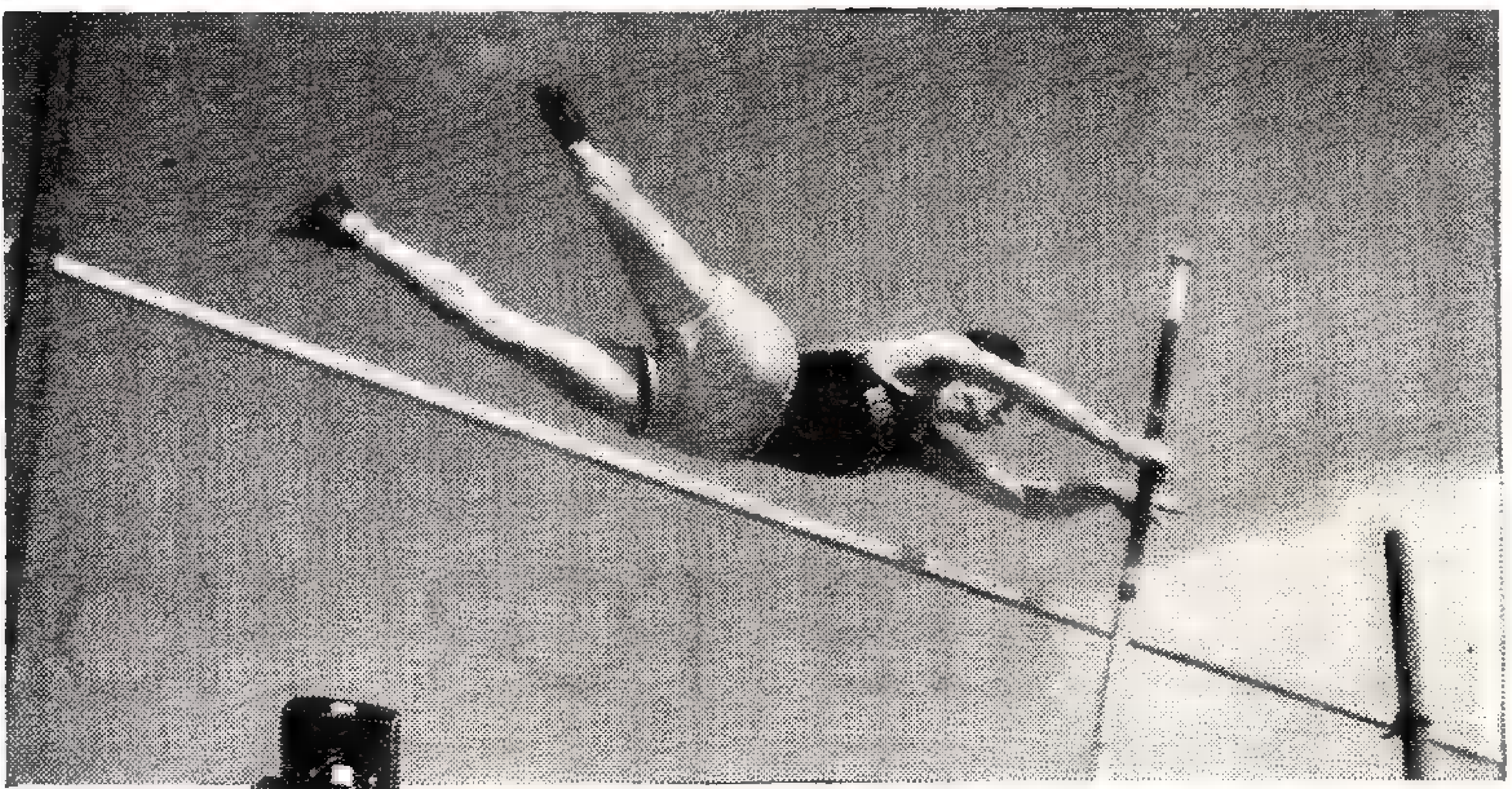
The ducks are finished by painting canary yellow with blue and red striping on the wings and head. Two small costume bells complete the toy.

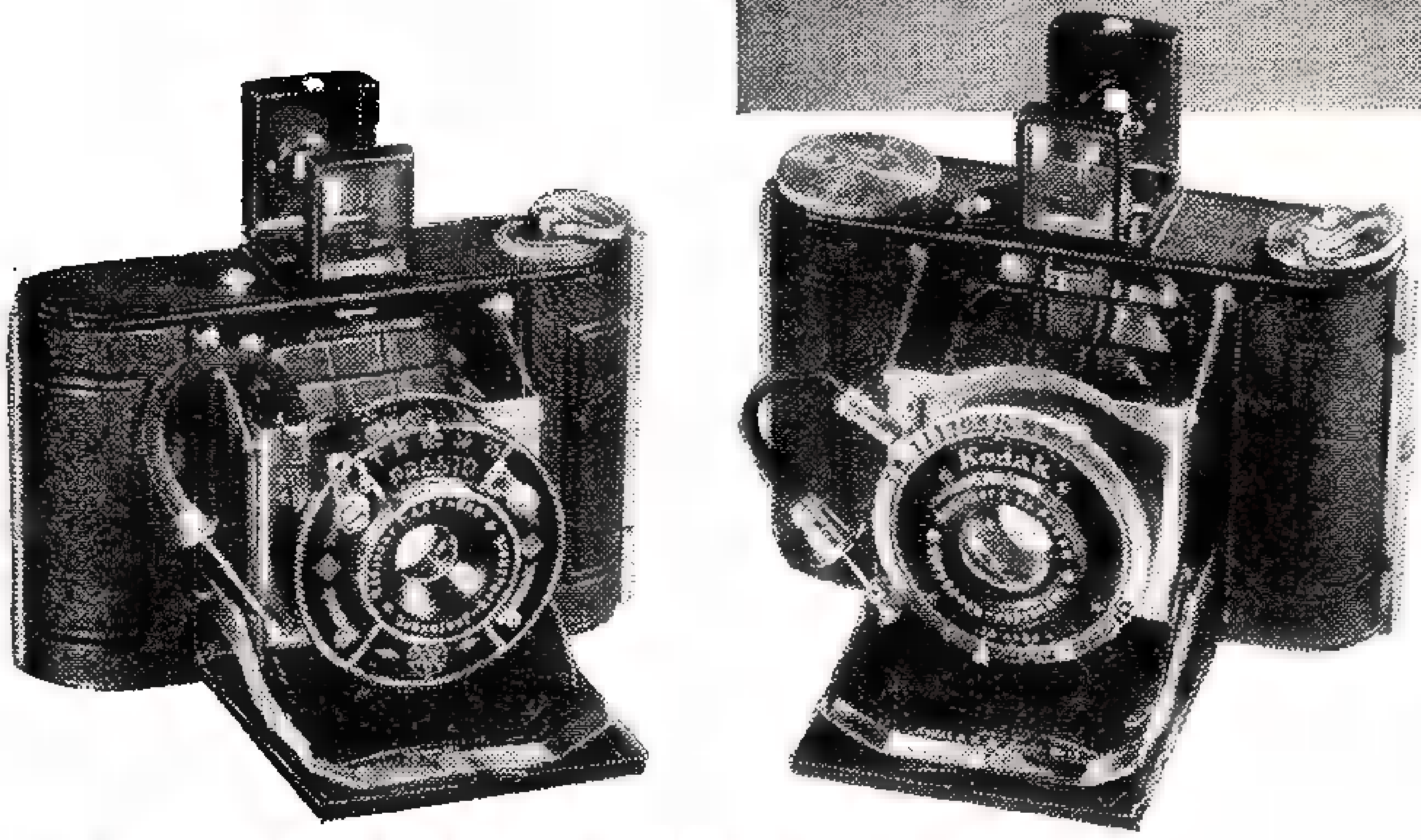

$2\frac{1}{4}$"
BLUE
YELLOW
$2\frac{1}{2}$"
BLUE
YELLOW
BELL
4"
CUT
TURN ON LATHE
HEADS TURNED ON LATHE
$\frac{3}{8}$x18" DOWELL
SAW IN TWO FOR DUCK BODIES
CUT HERE FOR TWO PEDESTALS
COUNTER-BORED FOR NAIL HEAD
END GLUED IN HOLE BORED IN BODY
$\frac{3}{4}$" x $\frac{3}{4}$" x 4"
$5\frac{1}{16}$" x $1\frac{1}{2}$" WOOD WHEELS
NAIL AXLE
THE DANCING DUCKLINGS

These cute little ducks go round and round when pushed along the sidewalk. Though they require only a few minutes to make the odd birds will provide unlimited entertainment for tots.

For Action . . .

KODAK VOLLENDA a precision miniature

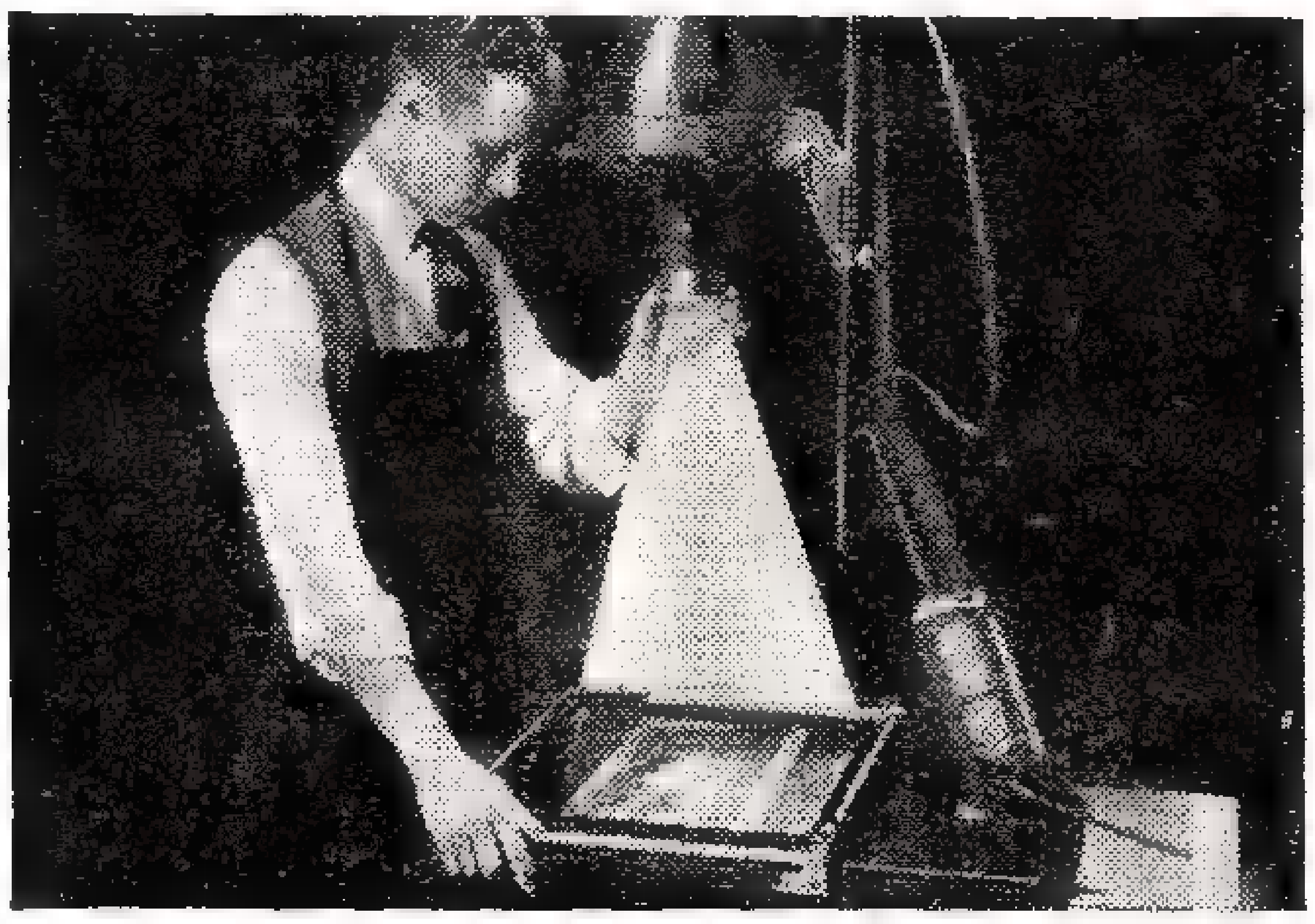




2 MODELS TO CHOOSE FROM

KODAK VOLLENDA fits in the palm of your hand, pops open for instant use at the touch of a button... Precise— it yields needle-sharp negatives. Sixteen 1-3/16 x 1-9/16-inch pictures each loading.

Available in two lens-and-shutter combinations. With 1/500-second Compur-Rapid shutter and *f*.3.5 lens—$44.50 . . . with 1/100-second Pronto shutter and *f*.4.5 lens—$25.



KODAK MINIATURE ENLARGER to supplement your tiny camera. Makes big prints from little negatives. Cabinet base optional. Price for enlarger, paper holder, Anastigmat *f*.4.5 lens—$67.50. Paper cabinet base, $10 extra.

KODAK PANATOMIC FILM extremely fine-grained, fully color-sensitive. Especially designed for miniature camera use—an ideal film for Kodak Vollenda and other small cameras. Makes striking enlargements possible with a minimum of grain.

Kodak
Panatomic Film
8 EX.
F 127

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Every picture maker should have this book—"How to Make Good Pictures." Its 224 pages are packed with useful photo knowledge. Tells new ways to use your camera... how to make trick pictures. Get your copy today.

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MM-5-36

STRANGE HOBBIES

A New York court clerk, Joseph J. Kolassa, has a most unusual collection hobby—elephants. From every corner of the world Mr. Kolassa has gathered glass, iron, wood, pottery and celluloid pachyderms until his collection now numbers more than 500. In the living room more than 150 of the beasts decorate the mantel while still more are found on the radio and on tables throughout the collector's home.

A Minnesota enthusiast has focussed his collecting urge on rolling pins. Every style of pin is included in the collection including ones which he made himself. To all newlyweds Mr. Smith presents a shining new pin.

Charles M. Strong of Adrian, Minnesota possesses a number of ancient religious books including a tiny volume of Bible stories measuring one and one-half inches wide by two and one-quarter inches long.

Collecting telephones is the interesting hobby of Arno Q. Wilkens, an electrician. In a building near Fleetwood, Pa., Mr. Wilkens has assembled more than two hundred telephones ranging from the early wall-box magneto phones to the new all bakelite dial instruments with self-contained bells. Included in the odd collection are microphones as used by radio stations, airplanes and ships.

Pieces of amber, known to geologists as fossilized rosin, form the interesting collection of Jerry Miller of Minneapolis. Many of his pieces contain prehistoric insects which were imbedded in the rosin while it was in a fluid state. Most of the insects are perfectly preserved.

ADLETS FOR HOBBYISTS

(See regular classified section for rates and other information.)

STAMPS

THE FIRST Balloon Flight Stamp issued anywhere is the commemorative of Professor Picard's famous flight into Stratosphere in 1932. This beautiful stamp is getting scarcer every year. We will send it together with complete set (6 values) of Denmark's beautiful Viking ships, complete set (5 values) General Judenitch Russia 1919, complete set (3 values) Victor Emanuel commemoratives of Italy, 1925, all for only 10c to approval applicants. Globus Stamp Company, 268-4th Ave., Dept. 150, New York, N. Y.

TWO Fine Airmail Triangles—Iceland triangle and new Bi-colored Mozambique triangle, and fine packet including Ubangi, Chad, Gabon, Inini, St. Pierre, Togo, Senegal, savages, ships, and animal stamps. Only 5c to approval applicants, Potomac Stamp Co., Dept. 905, Washington, D. C

50 DIFFERENT Stamps cataloging over $1.00 only a dime to approval applicants. 20,000 different stamps at prices ranging from 1c. All stamps guaranteed genuine. A fine selection of U. S. revenues at 1c and up. Address F. G. Stein, Dept. 214, 7360 N. Seeley Ave., Chicago.

TRIANGLES—New Bi-Colored Mozambique airmail triangle; Bolivia and Guatamala triangles, smallest in the world; and the attractive Costa Rica triangle. All four "hard-to-get" triangles for only 5c to approval applicants. Arlington Stamp Co., Dept. 905, Bethesda, Md.

MAMMOTH Mystery Packet rare stamps only 10c to serious approval applicants, also valuable free premiums with every selection afterwards. Our stamps are better, our service is different. Fair-Play Stamp Service, 1215 Browning Blvd., Los Angeles, Calif.

BRITISH TURKISLANDS—Also Congo's—Montecarlo—Nigercoast—Uganda—Djibouti—Ecuadorian—Ivorycoast—Ubangi—Countries collectors need. Free for 5c postage. EMPIRE STAMP SHOP, Dept. MM., TORONTO, CANADA.

SCARCE Brazilian and Paraguay Airmails!! Set Charkhari Pictorials! Also Big Packet including Congoland, Gabonese, Newzealand, Guinealand, Algerian, etc.—3c to approval applicants. Hunziker, Box 225F, Minneapolis, Minn.

SCARCE Baden (Old German State), Exotic Mongolia. Turks Caicos, $5 U. S., Giant bi-colored Caymans, Imperforate. Park—free to approval applicants. Postage 3c. Viking Stamp Co., 1-M Hanson Pl., Brooklyn, N. Y.

105 DIFFERENT Stamps including large Spanish ship Cameroon, Gabon, Andorra, Azerbaijan, all for 10 cents to approval applicants. Swedell, 3129 Garfield Ave., Minneapolis, Minn.

110 DIFFERENT Stamps from Kountcheou, Inini, Latakia, etc., and Free Premium Offers only 3c to Approval Applicants. Badger Stamp Company, Dept. M, Milwaukee, Wis.

AIRMAILS—Brazil, Colombia, Ecuador, Mexico, Paraguay, all for 10c with double premium approvals. Progress Stamp Service, 235 S. Hope, Los Angeles, Calif.

STAMPS! 100 diff. 3c; 500 diff. 35c; 1,000 diff. 90c! Illustrated Album (4000 spaces) 22c. Approvals sent. Tatham Stamp Co. (D9) Springfield, Mass.

50 DIFFERENT Stamps from 50 different countries—5c to new approval applicants. Brownie Stamp Shop, Dept. M, Flint, Mich.

SENSATION: Airmails from 10 countries; U. S., South America; Pictorials 10c. A. Steele, Marlinton, W. Va.

FREE!!! King George Memorial Packet, 15 varieties. Postage 3c. Roberts, 901-T Fourth, Baycity, Michigan.

UNITED STATES—Elaborate Pricelist free. 45 different 10c. 75 different 30c. Seidenberg, Baroda, Mich.

STAMPS sent on approval. Quality at low prices. Fred Herzberg, MM 197, Grantley, Elmhurst, Ill.

FREE!! Civil War Stamp to approval applicants sending postage. Negus, Glendive, Montana.

SURPRISE Packet. Dime. Free Premium. Dawson, 1308-F, The Dalles, Oregon.

250 MIXED Stamps 10c. With approvals. Woods Stampco, Box 437, Bedford, Penna.

1000 WORLD Mixture, good variety, 25c. Davis, Box 162, Newburgh, N. Y.

COINS

$5000.00 EACH for Rare Coins. We guarantee to pay the World's Highest Prices. Old Cents up to $2000.00 each, 1860 Cent $50.00. Cents of 1861, 1869, 1870, 1881, 1890 $20.00 each, 1859, 1866 to 1875, 1909 $10.00 each, 25c before 1916 $300.00, 50c before 1916 $750.00, Lincoln Cents before 1932 $35.00 per 100. Paper Money $26.00, Foreign Coins, Half Cents, Half Dimes and thousands of others up to $2500.00 each. Send Dime for Large Illustrated List before sending coins. Romanocoinshop, Dept. 560, Springfield, Mass.

COINS bought and sold. Commemorative half-dollars San Diago $1.40, Stone Mountain 95c, Pilgrim $2.00, California Jubilee $2.00, Monroe 95c. Illustrated Catalog giving values U. S. Coins 50c. Coin Shop, 2510 Chester Street, Alameda, California.

$5.00 TO $500.00 EACH paid for Old Coins. Keep all old money. Get posted. Send 10 cents for Illustrated Coin Value Book, 4x6. Guaranteed Buying and Selling Prices. Coin Exchange, Box 17, Le Roy, N. Y.

COMMEMORATIVE $½s, Maryland, Lincoln, Kentucky, Texas, Stone Mountain, $1.50 ea. Eighty-page Catalogue Coins & Stamps 10c. Norman Shultz, Salt Lake, Utah.

FREE: Foreign Coin, Banknote and Large Illustrated coin catalogue, for 4c postage. Approvals sent. Tatham Coinco. Springfield-9, Mass.

OLD MONEY Wanted. $5.00 to $2,500.00 each paid for old coins. Buying catalog 10c. Robert Cohen, Box 483, Muskogee, Okla.

COINS, Beadwork, Indian Relics, Minerals, Books, Curios, Stamps. Catalogue, 5c. Indian Museum, Northbranch, Kansas.

INDIAN CURIOS

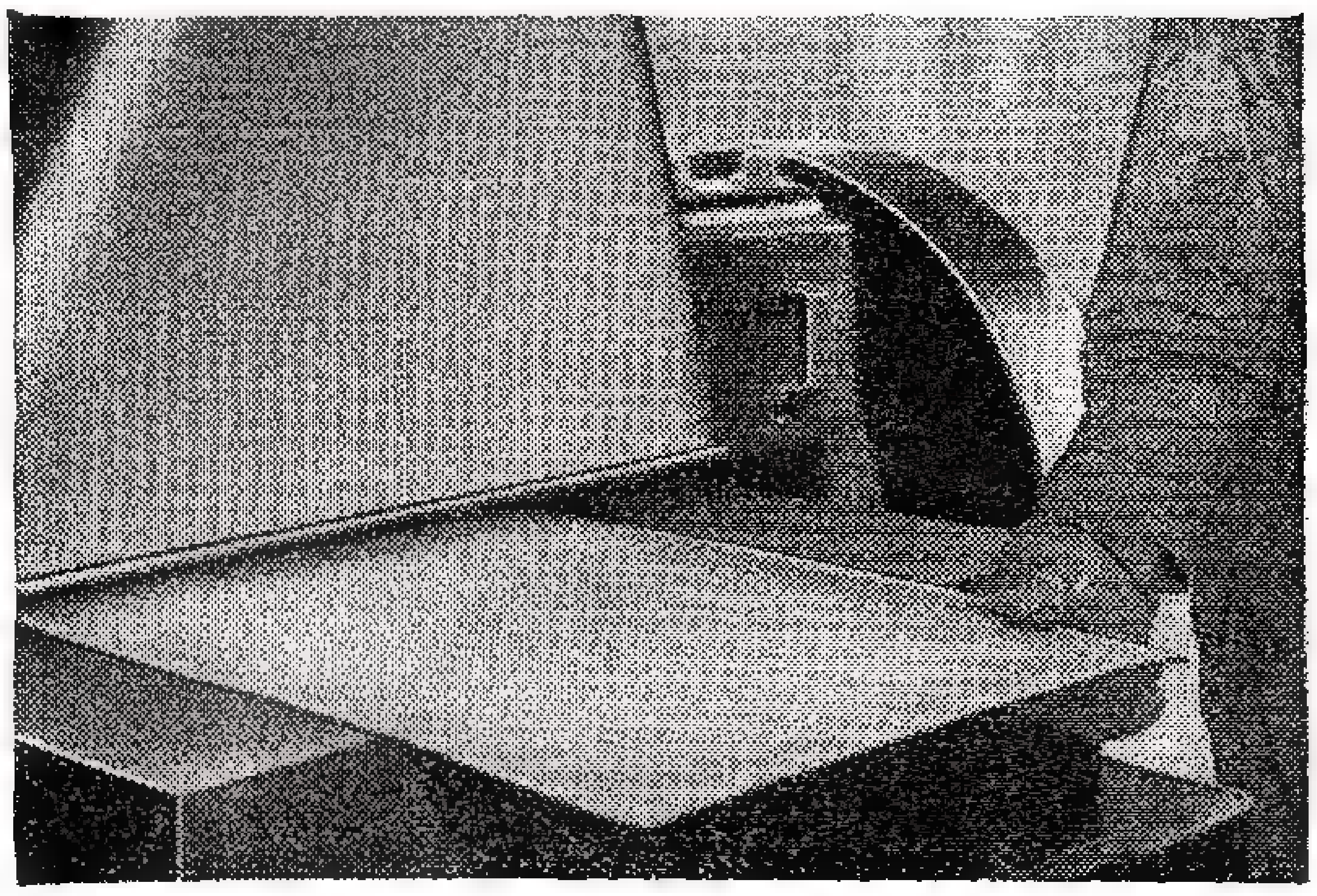
15 ARROWHEADS, Scalpingknife, Gempoint, Scraper, Wampum $0.99. Peacepipes, Curios, Flintlocks. Photolist 10c. Paul Heikes, Rutland, Illinois.

15 GOOD Indian Arrowheads 50c. Tomahawk head 50c. Catalog 3c. H. Daniel, Dardanelle, Arkansas.

FORD GASKETS ARE BUILT TO WITHSTAND HIGH PRESSURE— UNDER FIRE

The development of the modern high-compression engine brought many new problems. Higher compression meant greater power and increased economy from smaller engines. But it also meant greater loads on various engine parts.

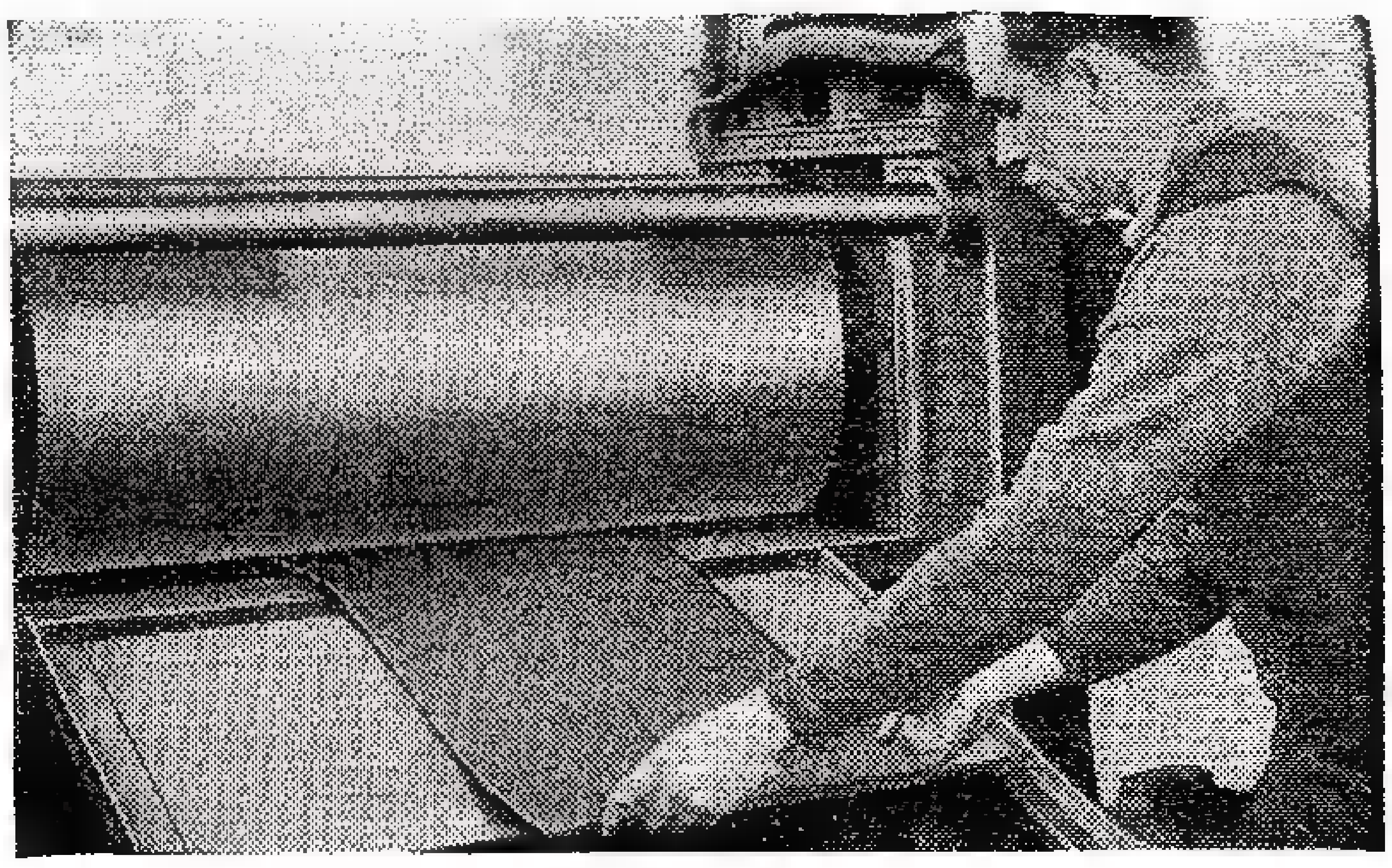
Many parts which served their purpose well in ordinary engines could not stand the added strain. New materials and new methods of manufacture were needed to meet the more severe requirements.



Forming the tongues in the steel core used in Ford V-8 gasket.

Take gaskets, for example. Each explosion in a Ford V-8 engine exerts pressure of about 600 pounds per square inch. That pressure must be held in by the cylinder-head gasket. And at the same time the gasket is exposed to the flame from burning gases with temperatures as high as 3000 degrees.

To meet these conditions required the development of an improved cylinder-head gasket. It has a steel core between two asbestos sheets which are mechanically and permanently bonded to it. The asbestos is so treated that water, oil or gasoline will not affect it. A steel edging around combustion chamber openings adds further strength and protection against blowing out. This type gasket is best for aluminum cylinder heads because it prevents the electrolytic action which causes gasket corrosion.

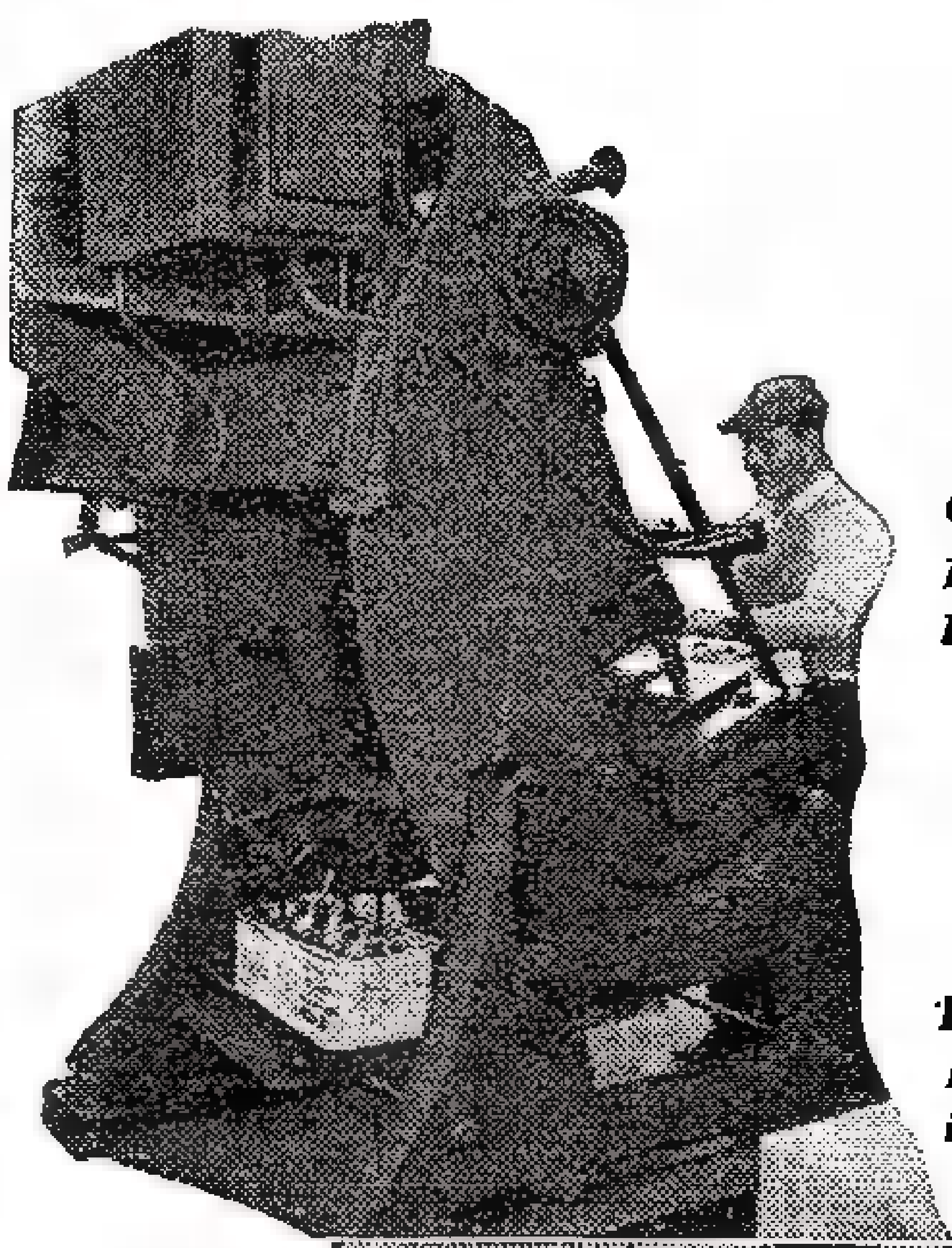


These rolls bend the tongues over to hold asbestos to steel core.

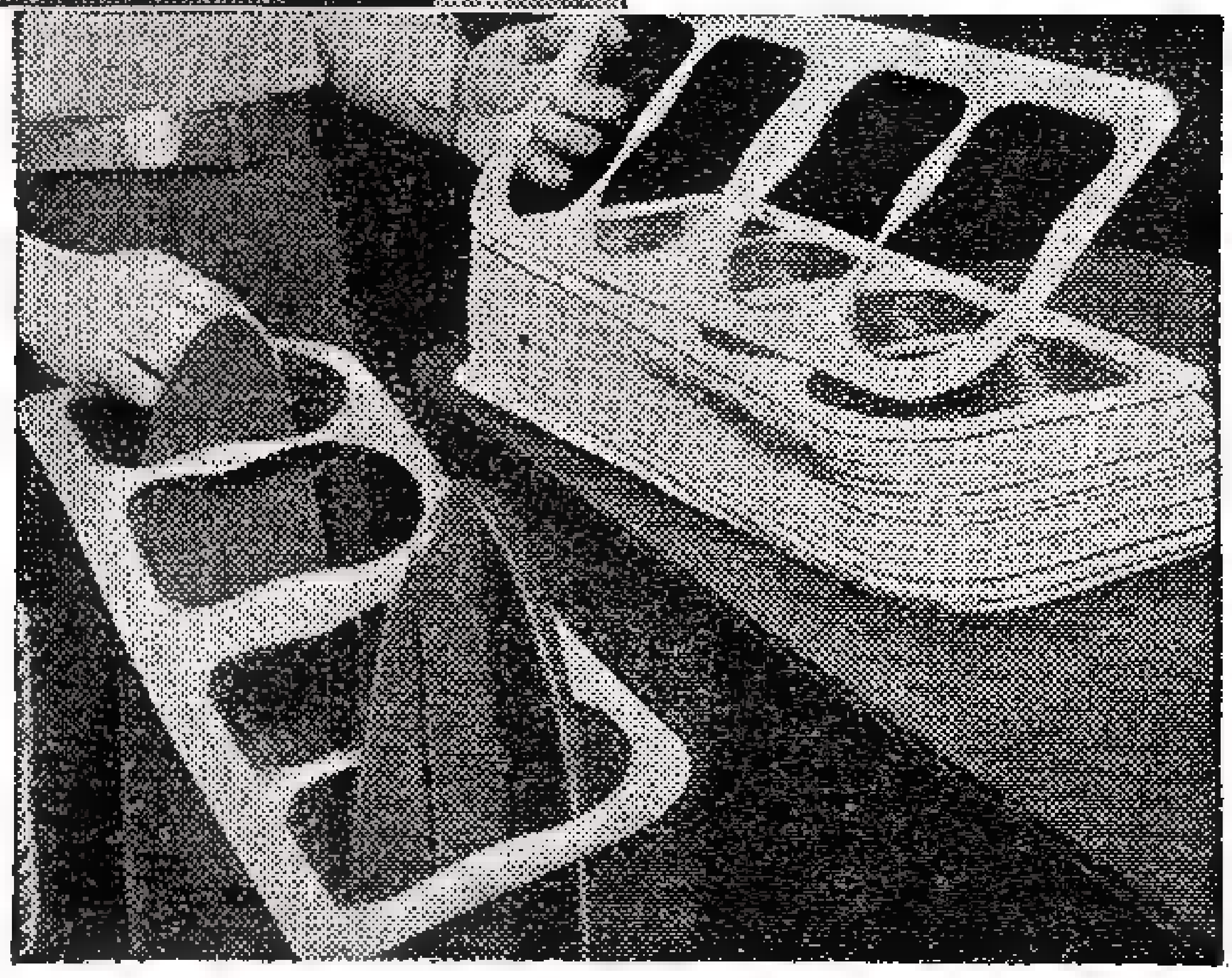
Regardless of where it serves or what it does, the most suitable and most economical part for a Ford is one which meets Ford requirements. When replacement parts are needed, insistence upon Genuine Ford Parts will help to maintain the high performance which was built into your Ford car or truck at the factory.

FORD MOTOR COMPANY

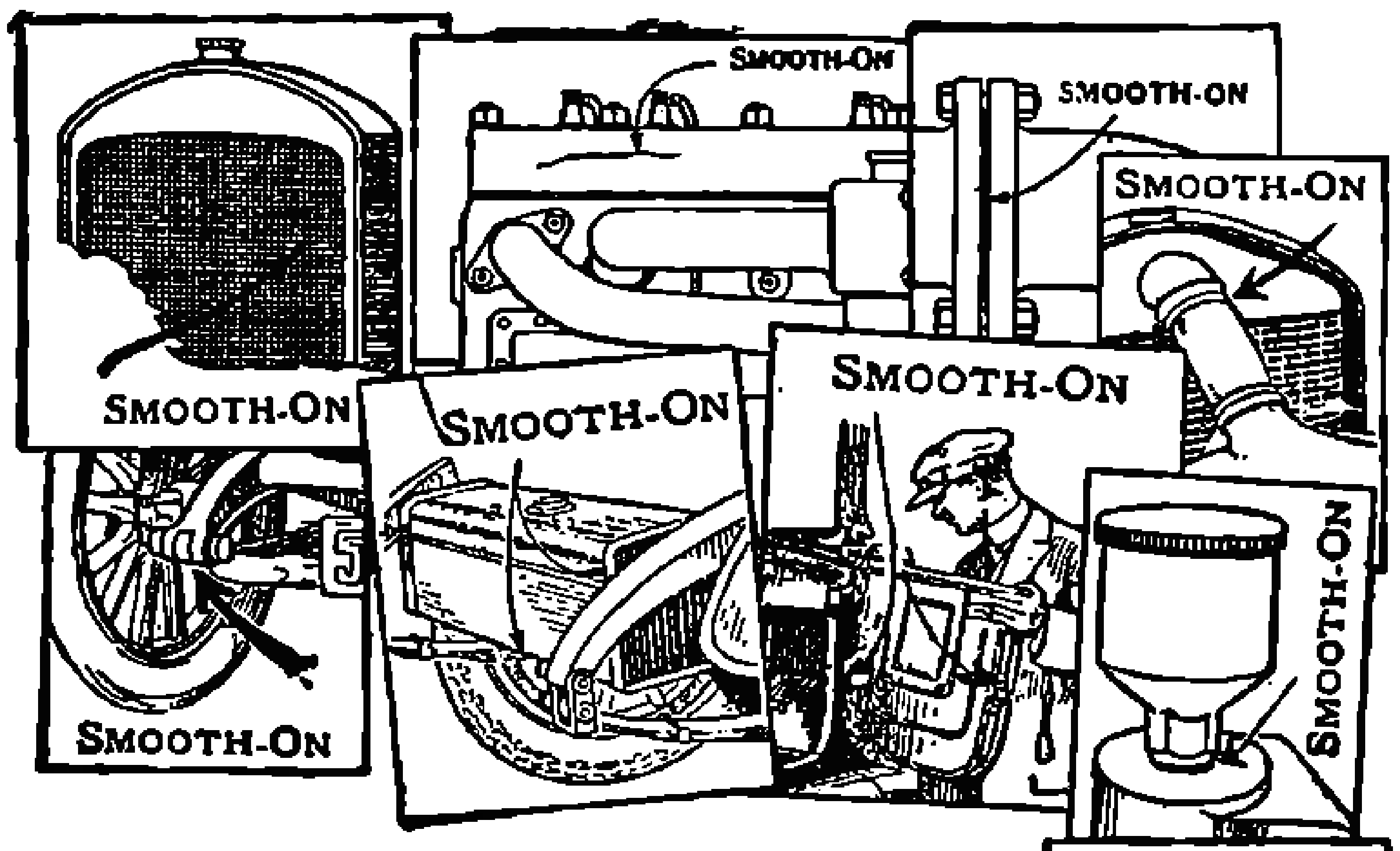
GENUINE Ford PARTS

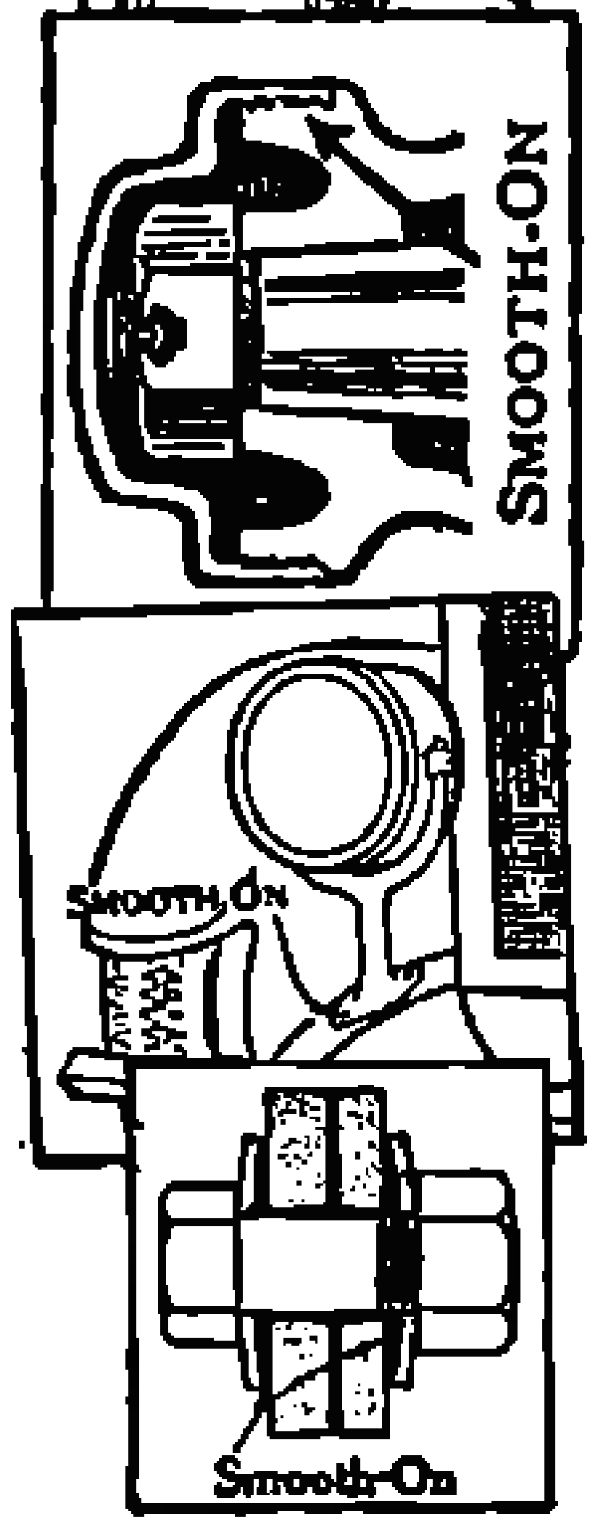


One of the punch presses in gasket department at the Ford Rouge Plant.



Partially completed Model A gasket showing how flange is curled over asbestos liner.





Save Much Money On Auto Repairs

With Smooth-On No. 1 you can make the following repairs easily, quickly and usually at almost no expense.

Stops Leaks

of water from a frozen, punctured or corroded radiator (nothing put inside), from a cracked engine jacket or from a loose hose connection of lubricant from a cracked crank, gear or differential case or bad joint; of gasoline from tank or line joint; of exhaust fumes from manifold, muffler or heater connections.

Make Loose Parts Tight

Smooth-On No. 1 makes solid connections—keeps lubricator terminals, grease cups, hub caps and nuts from backing or dropping off; tightens loose fenders, lamp, tire and license plate carriers; makes screws stay tight in hinges, locks, robe and foot rails, window and dash moulding; tightens loose spring bushings to prevent wear and squeaking. A bolt with Smooth-On No. 1 under head and nut washers makes a strong replacement for a weakened rivet.

Smooth-On No. 1 metallizes quickly, holds perfectly on any metal and is proof against vibration and heat. Anyone can get thoroughly satisfactory results by following the illustrated directions in the free repair booklet.

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STOPS LEAKS
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Send for booklet and get Smooth-On No. 1 in 7-oz. or 1 or 5-lb. can from any hardware store.

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574 Communipaw Ave., Jersey City, N. J.

Please send the free Smooth-On Repair Book.

Name ....

Address ....

5-36 ....

Normandie Docked With Tug Fleet

[Continued from page 53]

tine and we could see her following us at a distance. When we reached the pier the seven other tugs assigned to the job were already there, spread out fanwise in the middle of the river.

The *Normandie*—now even larger by contrast to the surrounding buildings—halted in midstream, at right angles to her 1,100-foot pier. The Alice M. and two other tugs moved in on her starboard bow, side to side, and three other tugs took up a similar position on the port bow. I heard several quick blasts from Captain Huseby's whistle and the six tugs, whose whistles had replied in kind, started pushing simultaneously, acting like a vice on the forepart of the ship.

When she had straightened out, she began to move ponderously under her own power towards the dock. The Alice M. and the two companion tugs had to scurry around the side of her to avoid being run down. When we got near the stern, I noticed that two extra tugs had taken long hawsers aboard from the aft end of the giant vessel and were standing by, ready to pull her close to the dock when her full length was alongside. It all appeared so effortless, so routine, that I was not aware the job had been completed until I saw the passenger gangplanks being lowered.

Linoleum — Industrial "Accident"

[Continued from page 83]

The materials are all carefully weighed and then poured upon a moving belt which carries them to the mixer below, then rolled upon burlap or cut to the design patterns and pressed upon the burlap base by hand.

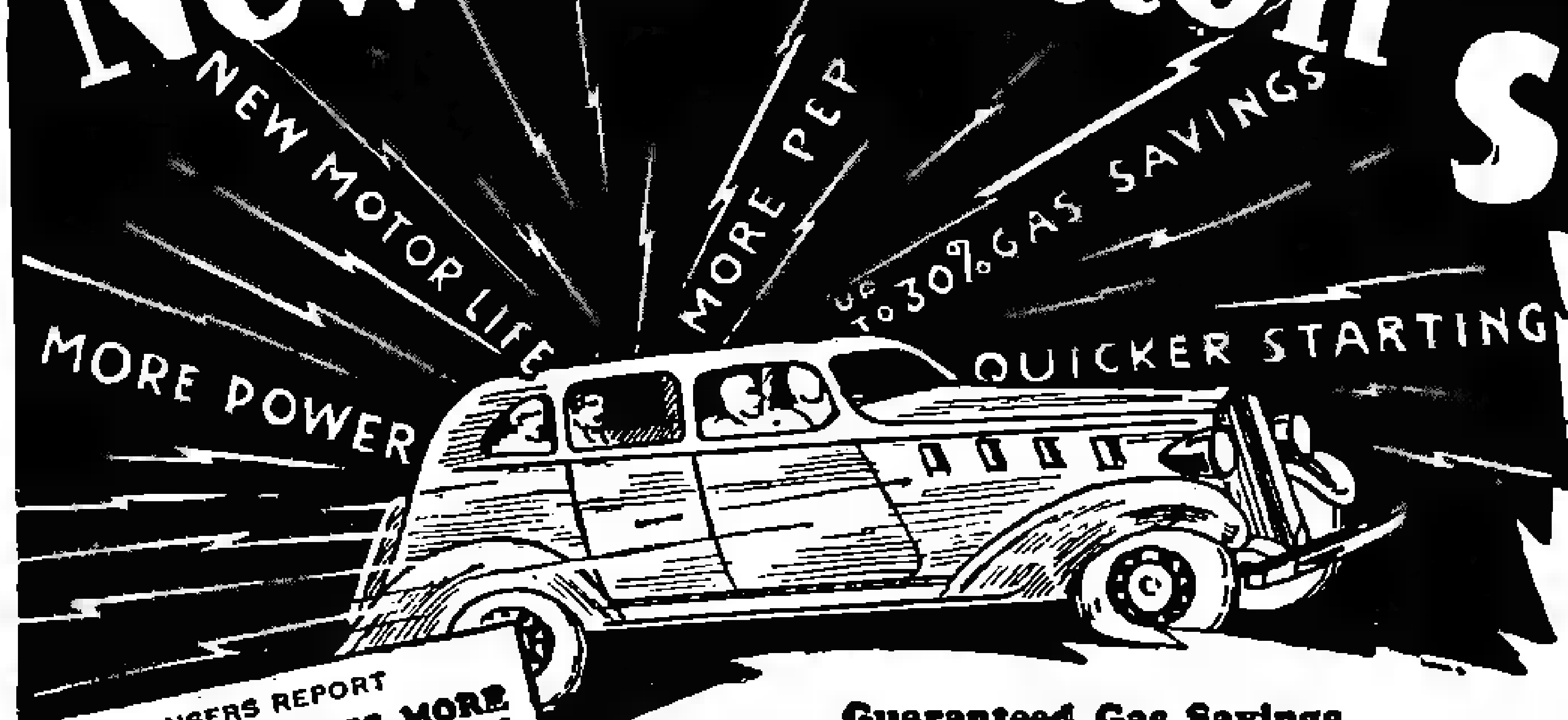
From the rollers, the linoleum passes directly into huge ovens, fifty feet high, for the "long bake." These are fitted with racks, from which the linoleum is hung in enormous folds. Each oven will accommodate more than a mile of linoleum. At constantly maintained temperatures, the linoleum is cured for a period varying from three to six weeks. Not until laboratory tests have proved it thoroughly cured is the oven allowed to cool.

At another linoleum plant material to be used as the base for printed patterns is removed from the stoves before it has wholly matured, and the design printed on it.

These designs are applied with wooden printing blocks which automatically take on a coat of varnish paint and then transfer it to the linoleum.

In all stages in the manufacture of linoleum, inspectors watch the material closely, and laboratory tests are made at many points.

New Invention WITH SUPERCHARGE PRINCIPLE SAVES GAS



USERS REPORT

3 to 7 MILES MORE PER GALLON

MOTORIST SAVES $180.00 a YEAR

"On my V-8 Ford it works miracles. Its added power, acceleration and top speed has sold me. The results are unbelievable."—*Ralph Fields, Mass.*

"Very glad to say, the Buick showed an increase of 5 miles more per gallon."—*A. V. Grove, Washington.*

"On my Plymouth, I obtained an average of 22 miles per gallon, an increase of 7 miles. This means a saving of $15 a month or $180 a year." *F. S. Peck, Calif.*

"It saves me one gallon a day. I had to buy 5 gallons each day—now only 4 gallons."—*L. V. Sweet, Pa.*

"I have twelve VACUMATICS on cars now, and they all show an increase in mileage. The car owners are very well pleased."—*Fred Taylor, Okla.*

"I have been placing VACU-MATICS on expert mechanics' cars. All are well pleased."—*J. W. Donahue, W. Va.*

A T LAST! Automotive engineers have smashed down the barriers to perfected combustion! The new VACU-MATIC solves the secret of greater power! With almost magical action, this amazing invention instantly puts new life and pep in any motor. It adds mileage to every gallon of gasoline . . . produces split-second pick-up, sensitive accelerator response, quicker starting, greater speed and smoother running.

Automatic — Nothing Like It!

The self-starter — four wheel brakes — knee action — streamlining . . . and now VACU-MATIC! The sensational money-saving invention! With it, engineers have achieved a practical means of balancing air and gasoline automatically for all speeds,

VACU-MATIC is *entirely different!* It operates on the supercharge principle by automatically adding a charge of extra oxygen, drawn free from the outer air, into the heart of the gas mixture. It is entirely AUTOMATIC and allows the motor to "breathe" at the correct time, opening and closing automatically as required. No idling troubles—no carburetor adjustments necessary. It is so simple it will amaze you—so practical it will save you many dollars on gas costs,

Guaranteed Gas Savings

VACU-MATIC proves itself on every car., It is guaranteed to give worthwhile gas savings, quicker pick-up, and more power or it costs you nothing. You can instantly tell the difference in added power and motor performance — you quickly notice the cash savings on gasoline.

Fits All Cars

VACU-MATIC is constructed of six parts, assembled and fused into one unit, correctly adjusted and *sealed at the factory*. Nothing to regulate, Any motorist can attach VACU-MATIC in ten minutes., Once in, its only reminder is the surge of instant power and speed it gives to the motor and the savings it affords your pocketbook,

AGENTS & SALESMEN

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Free Details

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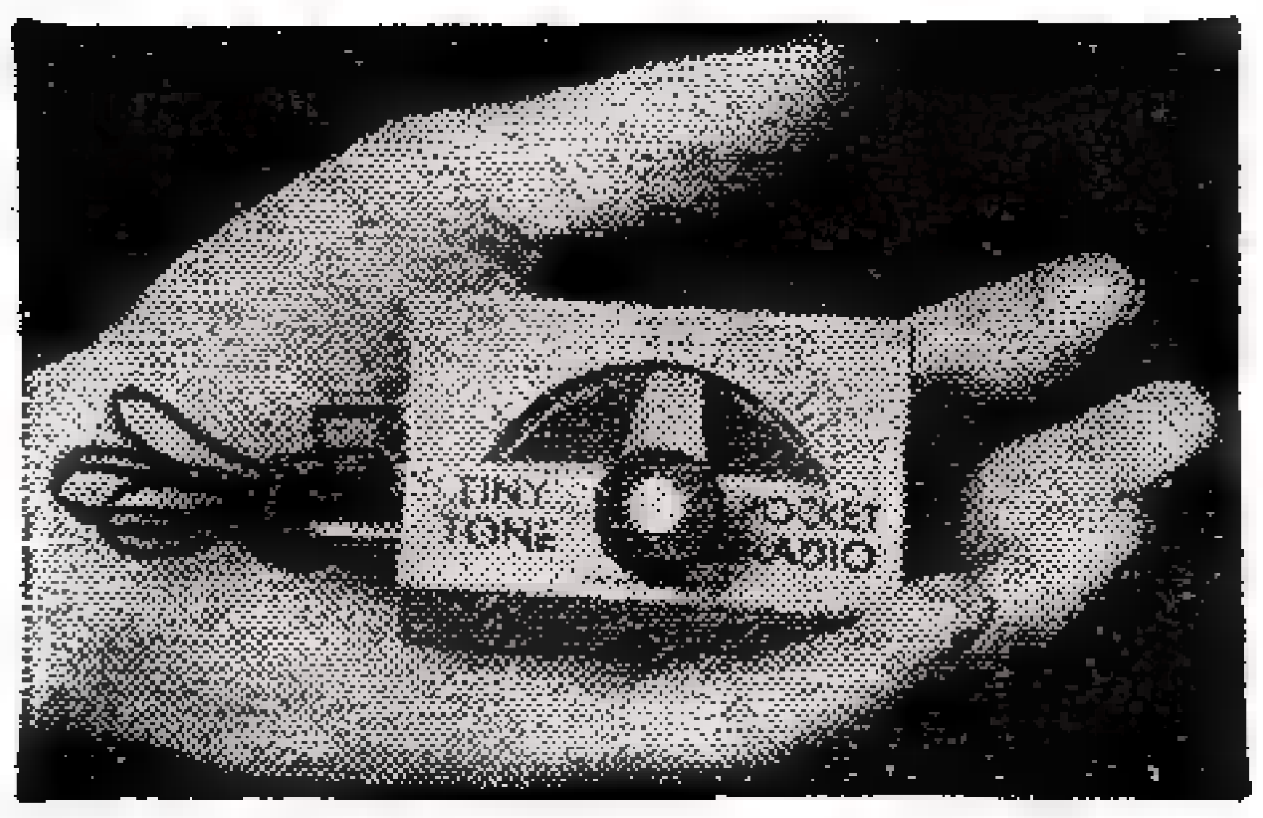

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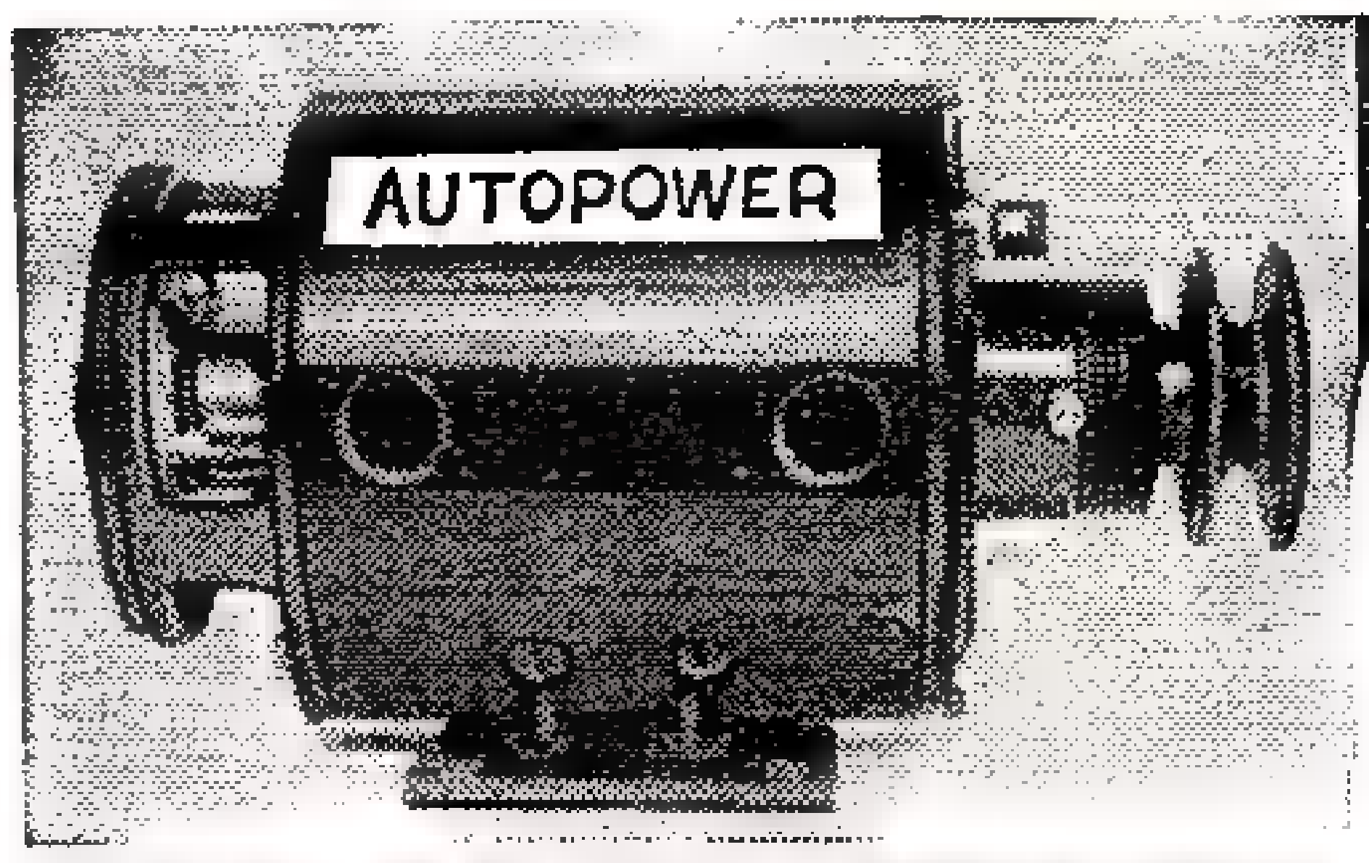

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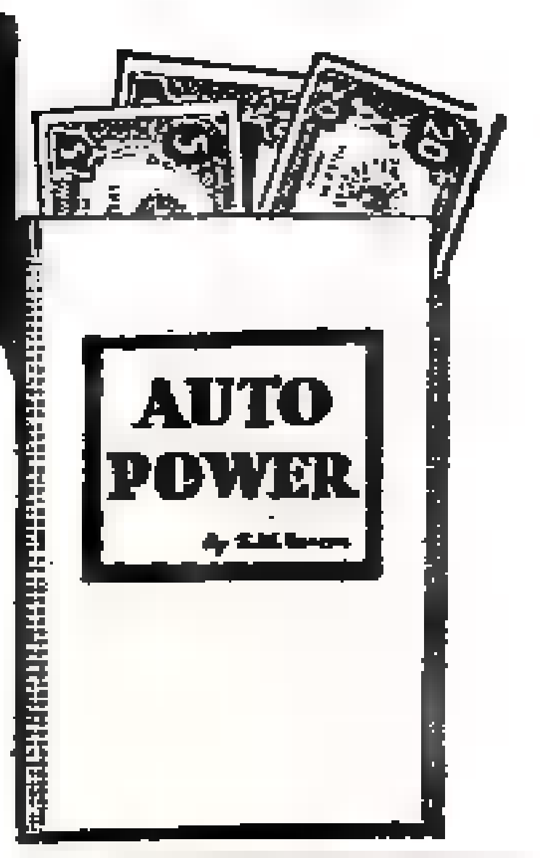

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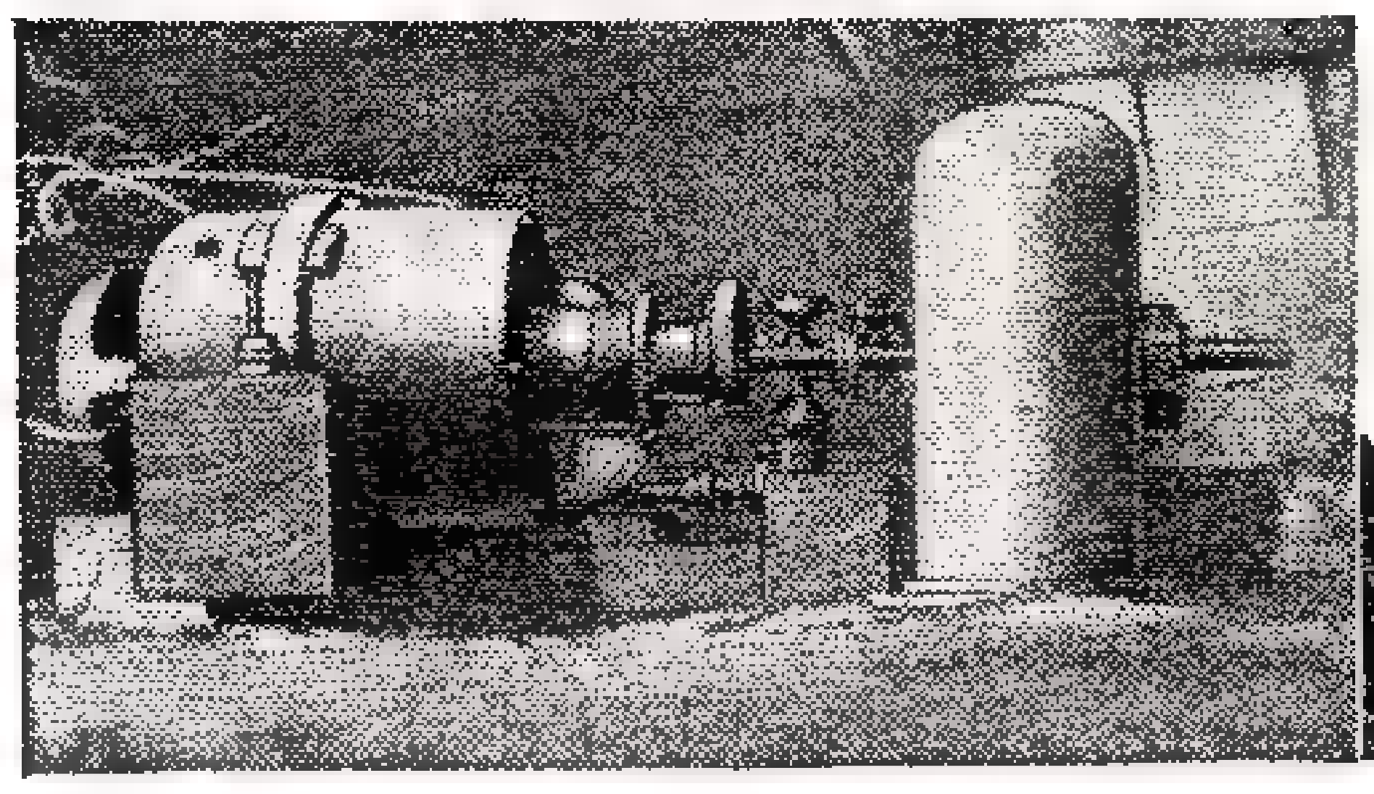

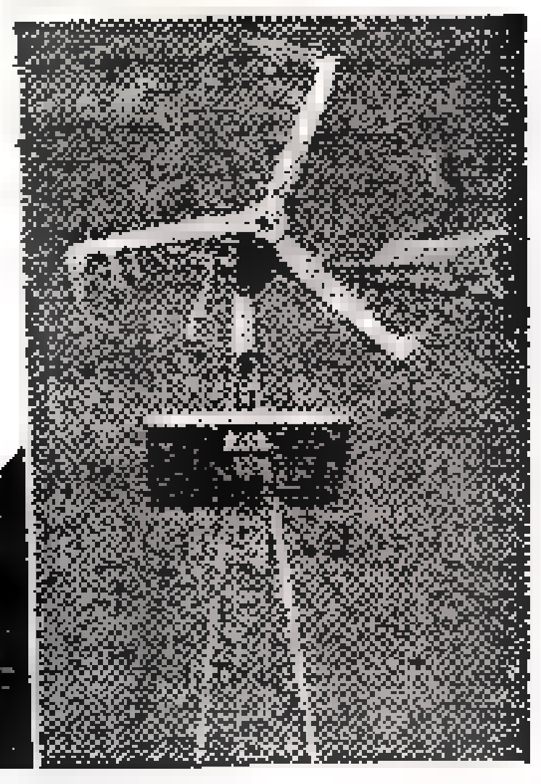

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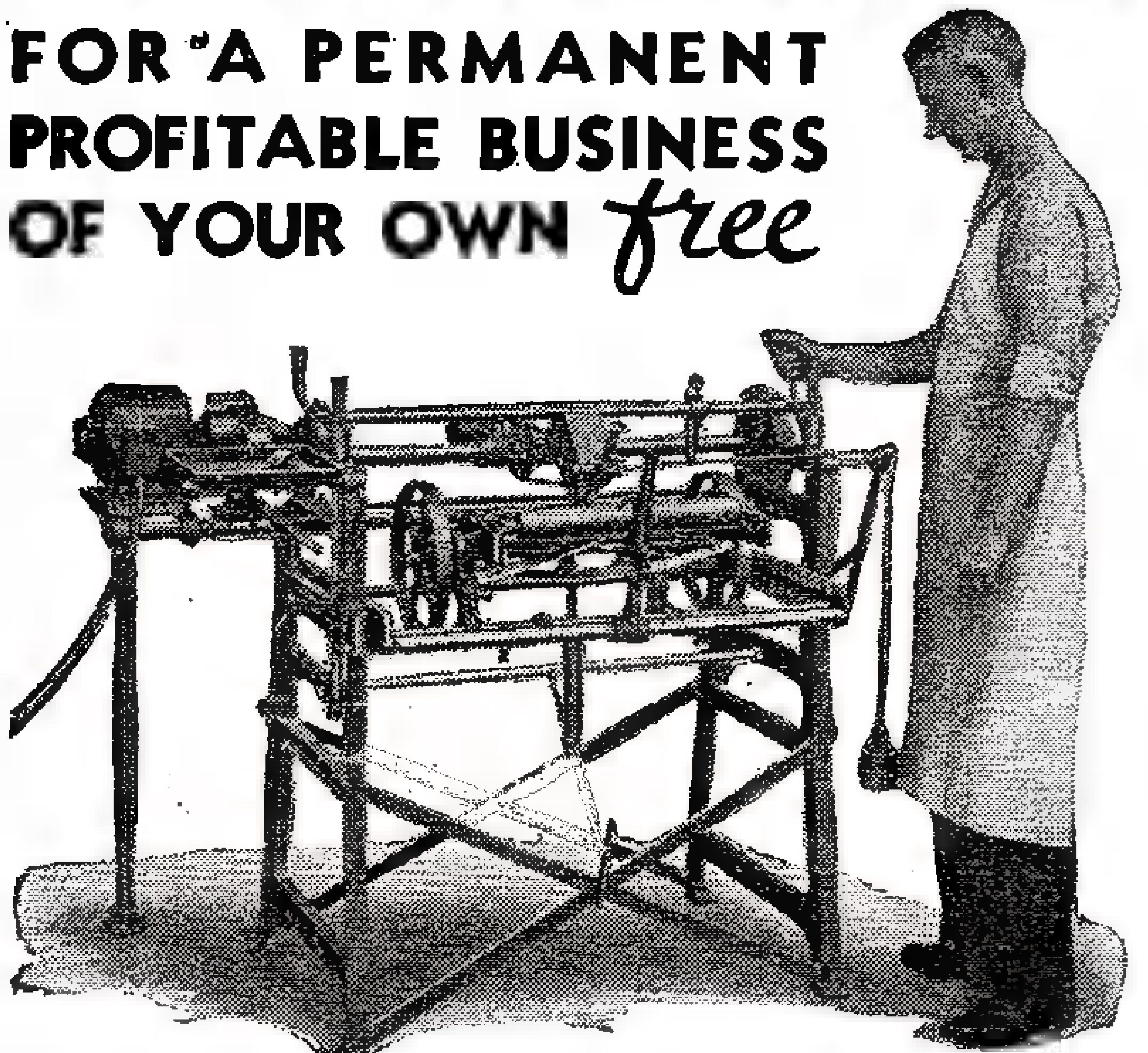

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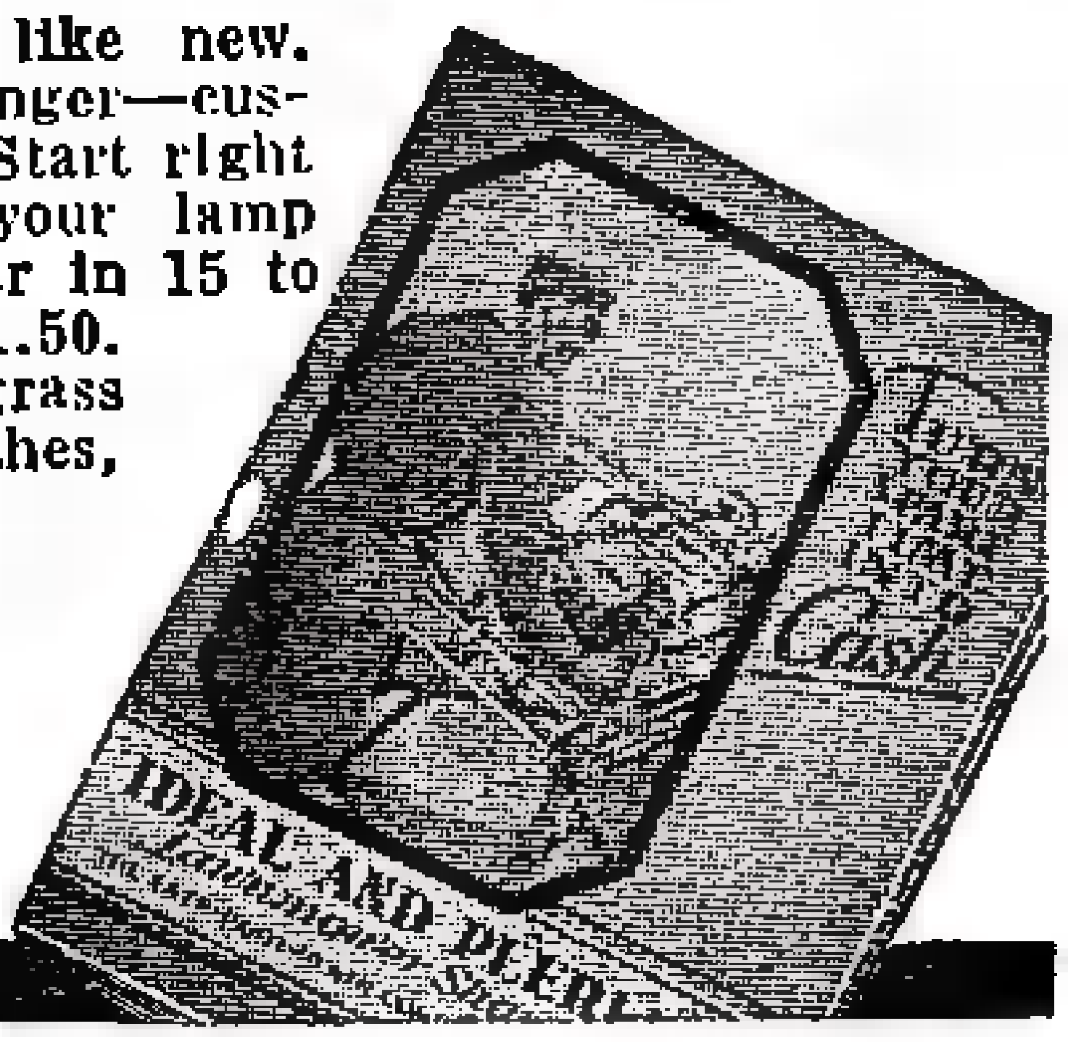

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Hollywood Stars Turn To Hobbies

[*Continued from page* 57]

paraphernalia for an endless camping trip, including stove, adjustable bed, sink, cupboards, utensils, electric lights and storing space. His plans for this trailer were published in Modern Mechanix and are now available in blueprint form.

In line with this type of building hobby, cabinet-making has slipped to the fore as one of the most fascinating of pastimes to Hollywood people. Arthur Hohl, star of thrillers like *Superspeed* and *Eight Bells*, recently discovered what could be done with a little lumber and some tools—and since then has furnished an entire house with the products of his own plane and saw.

Planes, model and genuine, hold a peculiar fascination for people of the screen. It is here that Ruth Chatterton, one of the few mechanically-minded actresses, shines brightly. Paul Lukas, capitalizing on the experience he gained in the war, has a Spearman open-air bi-plane and is his own mechanic.

The spell of this tinkering habit has swept so completely over the film city that even minor studio attaches have been reached. Sound-technicians meddle with cameras, and cameramen go in for wireless stations, talking with China and Australia nightly.

Make These Novelties With Plastics

[*Continued from page* 111]

with the lathe going. The points embed themselves in each side of the plastic and it can be turned to fit.

The top is turned in the same manner to the right size. It, however, has a shoulder cut on the under side to keep it from sliding off. A hole is bored half way through the top for the knob which is made by boring a slightly tapered hole in a small wood block on the face plate, driving a short section of plastic rod to a tight fit, and turning this to the shape and size of the knob shown.

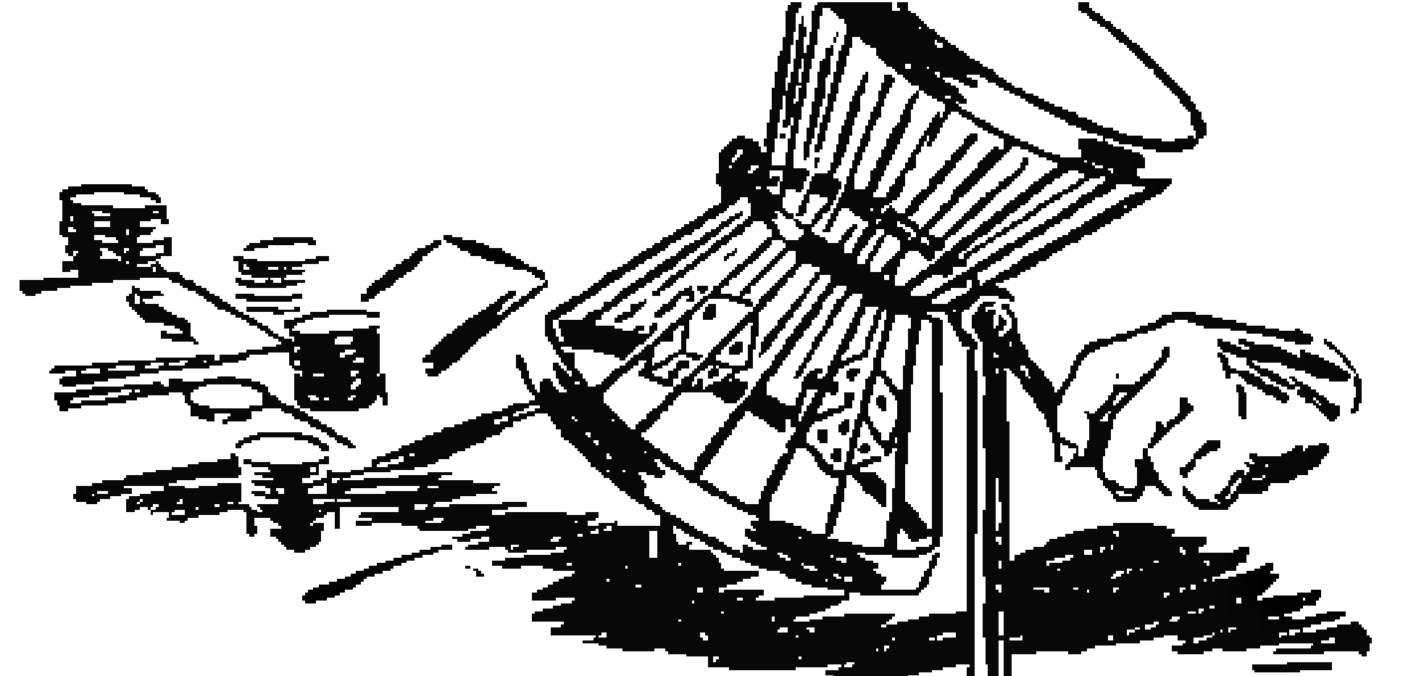
A further adaptation of the method used in making the ink well, is shown in the dresser box. Starting with a tube of larger diameter, in this case 3⅛ inches, the truing of the ends and turning of the bottom, top and knob are virtually the same as with the ink well.

With the tube on the wood spindle, the groove for the inlay was made. A file tang was sharpened to a narrow, flat edge and this used to cut under each edge of the cut. This step is important for the lead later is tapped, flattened and thus locked in place, never to work loose or come out.

Cut one end of the strip square, lay it in the groove in the plastic and with a very light hammer, tap it repeatedly to lock it. Care

[*Continued on page* 144]

You're trusting to Luck...



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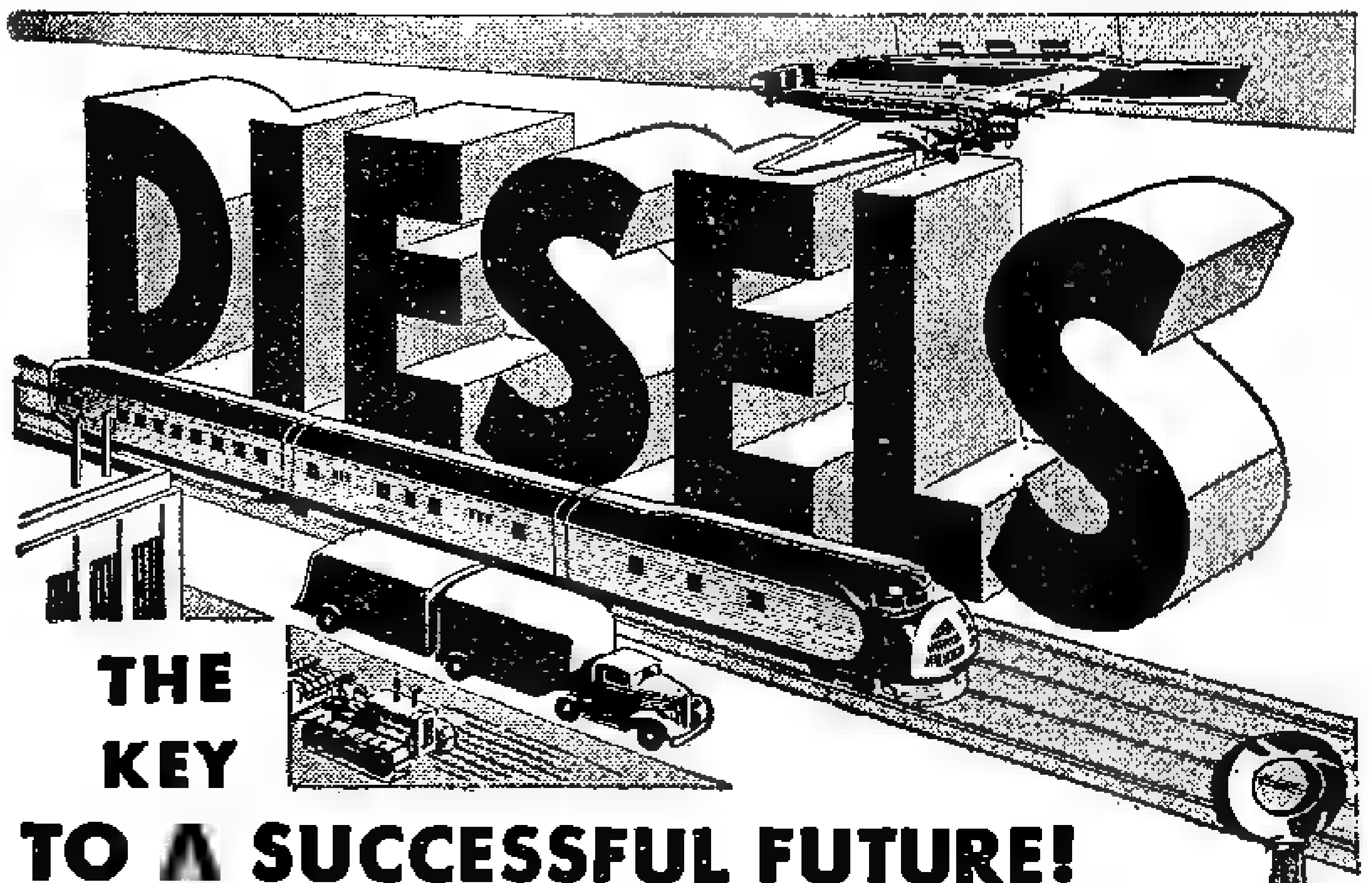

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SEND FOR FREE CATALOG

Amateurs Capture Action

[*Continued from page* 69]

lutely necessary—if, for example, you are following a moving object. Always shoot moving objects at a 45-degree angle, coming into the camera or going away. Remember that hundreds of good newsreel shots have been turned down by editors because of too much panoraming, and unsteady pictures.

One to Fifty Dollars a Foot

Another and more fertile field now is opening to the amateur who can do work of professional quality. Twenty-six hundred free-lance cameramen, scattered over the world, today are producing pictorial and travel shots for feature pictures. Usually they are equipped with professional camera and sound-recording devices. Their films, when accepted, bring from one to fifty dollars a foot. They are not "spot news," but pictures that may be used in framing other productions—atmosphere shots, backgrounds, and mob scenes, to be used in connection with studio-made action. In their libraries, large Hollywood studios have thousands of feet of such material, collected over a period of years for use in feature productions. One cameraman alone has shot 3,000 stills and 150,000 feet of film.

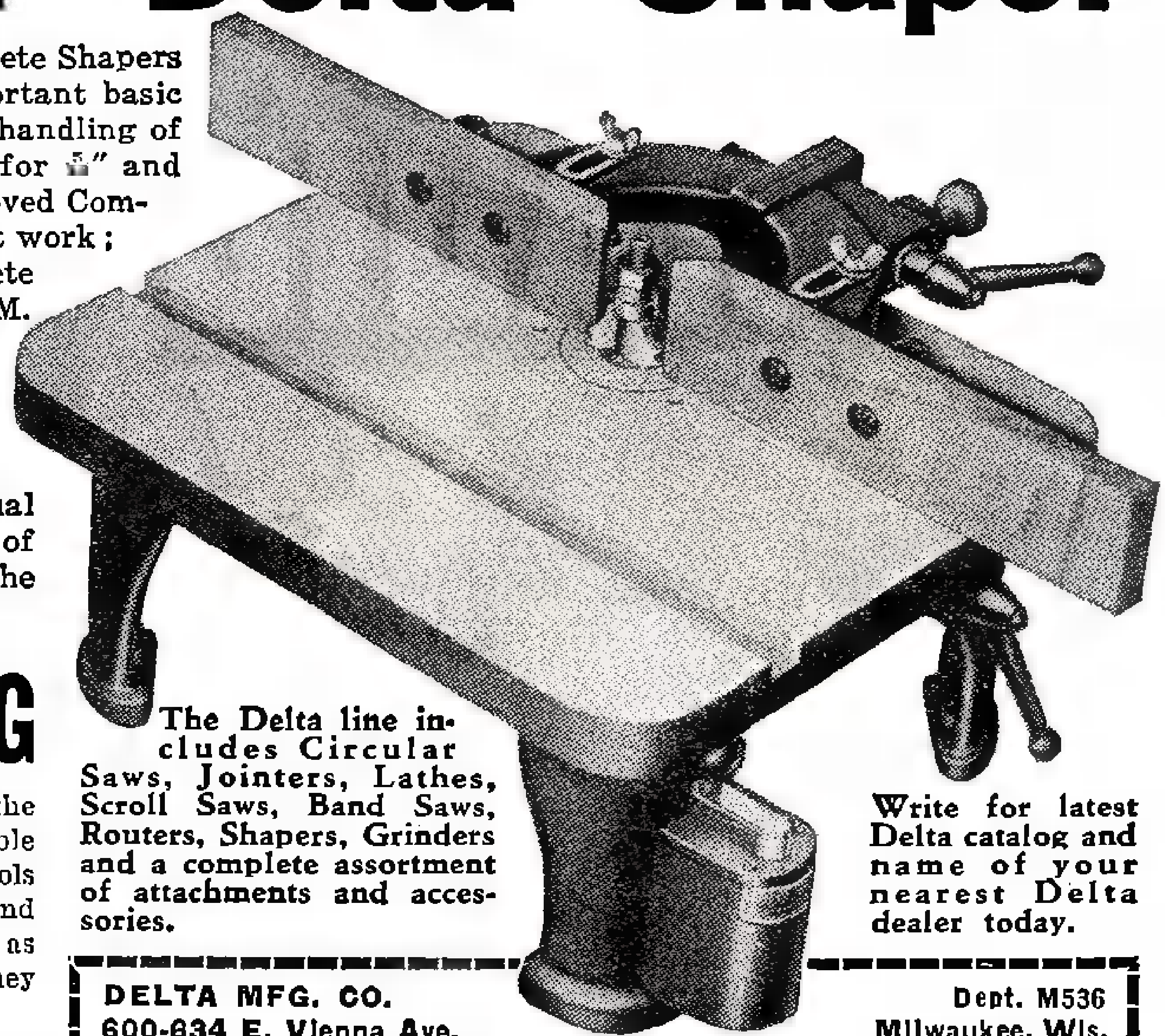
Many amateurs are traveling the globe, bringing home pictures of extreme interest. Some make prints, editing, cutting, and titling them, to distribute among friends. Others have sold them to industrial companies or for visual education purposes, thus making their hobby pay its way.

Many Gadgets Aid Filming

The advanced amateur who strives for professional effects, needs to carry a rather bulky kit of auxiliary lenses, filters, meters, and other equipment. One man has equipped his camera with so many accessories that it is virtually a walking laboratory. A home-made "air" viewfinder, built from a square brass tube painted black inside, gives clear, bright images of natural size. Through a tripod socket in its top, the camera can be turned upside down for reverse shots, while jointed tripod heads allow it to be tilted in any plane or rocked from side to side. A permanently-attached light meter gives correct exposure at a glance, while a distance meter, fastened to the finder tube, permits rapid focusing.

Special microphotographic accessories now help record the latest news of medical science. Bacteria and molds may be photographed under strong magnification; yeasts at work, tissues ravaged by disease, eggs being fertilized and growing, provide thrills.

Here's the New "Delta" Shaper



One of the simplest and at the same time most complete Shapers ever designed for the workshop. Some of its important basic features are: 1. Extra Large Table permitting the handling of large work with ease; 2. Interchangeable Spindles for [illegible]" and ½" hole cutters for various types of work; 3. Improved Completely Adjustable Fence for all varieties of straight work; starting pin for curved work of all kinds; 4. Complete Guarding system; 5. High Speed of 10,000 R.P.M. which with standard 3-lip Delta cutter gives over 30,000 cuts a minute, thus insuring smooth and finished work; 6. Complete range of cabinet and sash cutters for all types of mill work.

For full details and description of this unusual tool together with illustrations of large variety of work that can be done with it, send coupon for the new 1936 Delta Catalog.

The Delta line includes Circular Saws, Jointers, Lathes, Scroll Saws, Band Saws, Routers, Shapers, Grinders and a complete assortment of attachments and accessories.

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It is crowded with photographs and information about the new line of 1936 Delta tools. It contains much valuable information that every man interested in motor-driven tools should have. It shows how Delta tools are built to stand the grind of production work, and yet are so low priced as to be within the reach of all, how they save time, money and labor—and quickly pay for themselves.

Mail coupon without delay. Enclose only 10 cents at same time for Book No. 2 of Practical Delta Projects. 32 pages of new and novel things to make, with numerous blue prints, working drawings, photographs and illustrations—and complete directions.

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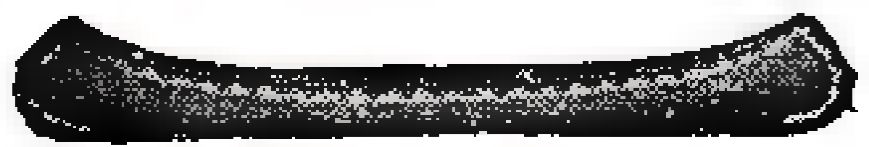

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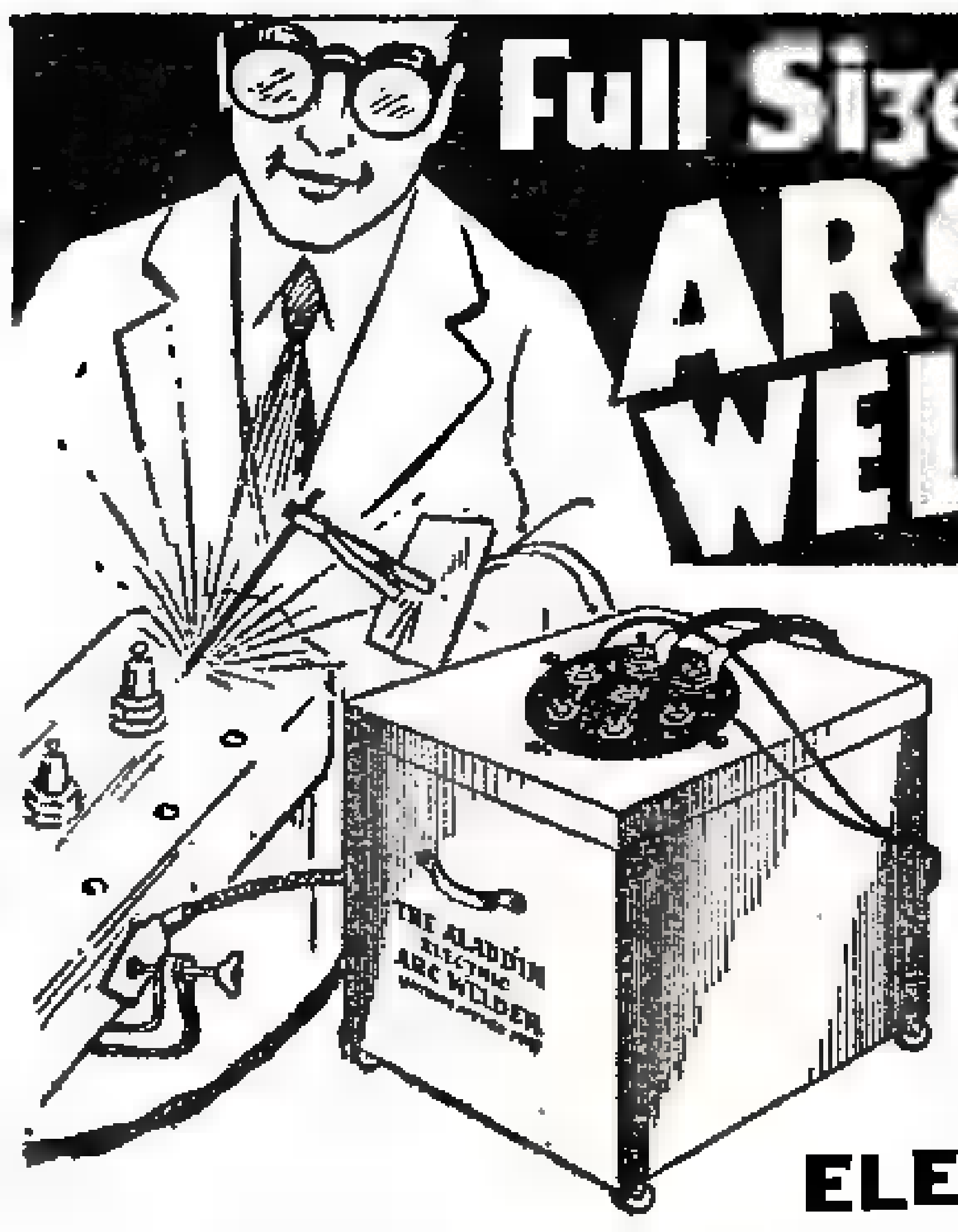
Full Size Professional ARC WELDER Only $29.50



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☐ Send me your FREE 1936 Radio Catalog. Dept. B.

☐ Send me Parts List for ....

Name ....

Address ....

City ....State ....

Packing Thrills In a T. T. Track

[*Continued from page* 87]

of the more gentle parts of the track, shifts into higher gears can be made.

The track is so designed that various routes can be taken for these spins, to provide practice in negotiating sharp curves, climbing steep hills, making leaps and doing other tricks.

An approved T. T. course is as irregular as its designers can make it, and includes both right and left hand turns, and, if possible, a hill that will necessitate gear changing.

All starts are made with dead motors. The starting positions of contestants are determined either by qualifying trials or by drawing, whichever the promoter of the race specifies. The approved AMA system of flagging is used for controlling the race.

Although a typical Tourist Trophy race seems, especially to the spectator who is not familiar with motorcycle pranks and feats, to be an extremely risky, rough-and-tumble affair, there are some hazards that are barred. For instance, although the course can include such obstacles as ploughed ground, hairpin turns and steep hills, there must be no streams, ponds or other water hazards to negotiate. The presence of a mud bog or water splash would make the event, in the eyes of motorcycle race authorities, a Cross Country instead of a Tourist Trophy contest.

Super-Safe Plane To Span Ocean

[*Continued from page* 73]

ing the 500 miles per hour mark. It is reasonably certain that the time is not far off when purely commercial planes will be equaling if not actually surpassing this figure. That speeds like this will be attained with the conventional plane of today with it's numerous power plants strung like beads along the large-spanned wings is dubious.

What is more likely and probable is the gradual improvement of wing sections (which is constantly in process) attaining a point whereby it will be possible to dispense with a great deal of the area now essential to safe flight. Then; what today forms the predominant portion of a plane may well become a mere rudimentary member with, possibly, extensible surfaces for landing and other maneuvers which involve reduced speed. As a matter of plain fact the whole tendency of wing design today is directed towards this goal as pictured on the cover.

To bring New York within five hours of London would mean a facility almost beyond our imagination. Other complications, such as the continual threat in times of war to countries erstwhile virtually isolated, would attain fantastic proportions.

Wells Photographs Into Future

[*Continued from page* 38]

They grow without soil or sunlight, for the elements of growth are chemically provided, and the constant artificial light is much more life-giving than sunshine.

At the Boyce-Thompson Institution Dr. John Arthur has been growing plants in a solution of minerals and salts which take the place of soil. Although no sunlight reaches the room, the plants grow from four to five times normal rate in the rays of a sodium vapor lamp.

Space Gun Is Greatest Marvel

But a far greater marvel than any of those mentioned has excited the citizens of Everytown. It is a gigantic Space Gun—a monstrous, shell-nosed tower 1,500 feet high, half again taller than the Empire State Building. Like an incredibly huge cannon, it shoots projectiles entirely around the moon, and they come to rest in the Pacific Ocean!

It operates on the rocket principle, electrically discharging successive missiles. In this connection we can point to the work of Dr. R. H. Goddard, leading authority on rockets. At his laboratory at Roswell, N. Mex., he has built a 12-foot rocket which attains a height of a mile and a half, and Dr. Goddard estimates that a height of 50 miles could be attained.

As the scientists of Everytown prepare for their great experiment, the rocketing of human passengers around the moon, opposition develops in the form of Theotocopolous, a fanatical poet with a large following, who believes that science has gone far enough.

By means of television, Theotocopolous incites the populace to stop the flight, but because streamcar transportation has been tied up in anticipation of trouble, the enraged citizenry is compelled to march on foot to destroy the rocket tower.

Catherine Cabal and Maurice Passworthy, together with their parents, arrive at the tower by plane and rush to the thousand-foot elevator which lifts them to the entrance level of the space cylinder. Far below them, like tiny ants, Theotocopolous and his horde advance brandishing weapons to smash the electric cables.

Maurice and Catherine enter the cylinder. We see in it a hint of the mechanisms with which man may some day conquer space. Elastic straps with spring supports hold the bodies of the passengers and cushion them against the initial shock of the rocket discharge. A vault-like round door seals them against the bitter absolute zero of outer space. A periscope projects from the nose of the rocket car, enabling the passengers to watch the pageantry of the stars. Concentrated

[*Continued on page* 132]

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"Chinook" a Midget Gas Engine

[*Continued from page* 104]

silver solder or braze the two together.

The cylinder head is a hard aluminum turning, made from old piston stock threaded with a 72-thread to conform to the cylinder with small holes provided so that a spanner wrench may be used to screw it in place.

The crankshaft is easily made by turning from a piece of cold rolled steel.

The connecting rod is made of solid dural shaped by filing.

The piston is a solid piece of cast iron, turned and bored internally to the section shown. The port is cut out with a file as is baffle plate. The wrist pin is a piece of $\frac{3}{32}''$ drill rod pressed in.

To lap cylinder cut four slots in a brass tube as shown in drawing. This is fitted over a tapered shaft chucked in the lathe. Use water soluble valve grinding compound for lapping, holding the cylinder with a rag, because the metal gets hot. Run the lathe, working the cylinder back and forth on the slotted tube until the ridges made by the cutting tool are removed. Then polish with the fine compound until the cylinder walls are like glass. When lapping is finished, the piston should fit very snugly.

[*Continued on page* 144]

Fly Rod Fishing for Bass

[*Continued from page* 75]

useful on flowing water than in still water. In the set-backs and in placid water along a stream or lake the bass bug is in its element. The most effective way of using a bug of the sort is to cast it lightly up on the over-hanging grasses along a stream and then as gently pull it off to drop in the water.

An ideal fly rod for such bass fishing is the seamless tubular steel rod. It combines exceeding strength with a smoothness of action that is comparable to that of bamboo.

The fly line used for bass should be rather heavy to meet up with the demands of a rod having much backbone. The size C or D is a recommendation, soft and flexible rather than harsh and stiff. A six foot leader, level-calibered, is sufficient. When fishing bass in crystal clear water and using small flies, a tapered leader is a suggestion.

The same bait casting rod, reel and line as used in taking the large mouth bass prove effective on the small mouth variety. Again it may be stated that a seamless tubular bait rod will prove most satisfactory. It should be 5 to 5½ feet in length. A level-winding reel is a suggestion. A twelve or fifteen pound test line is best for light lures while an eighteen pound test hard-braided line is best for somewhat heavier lures.

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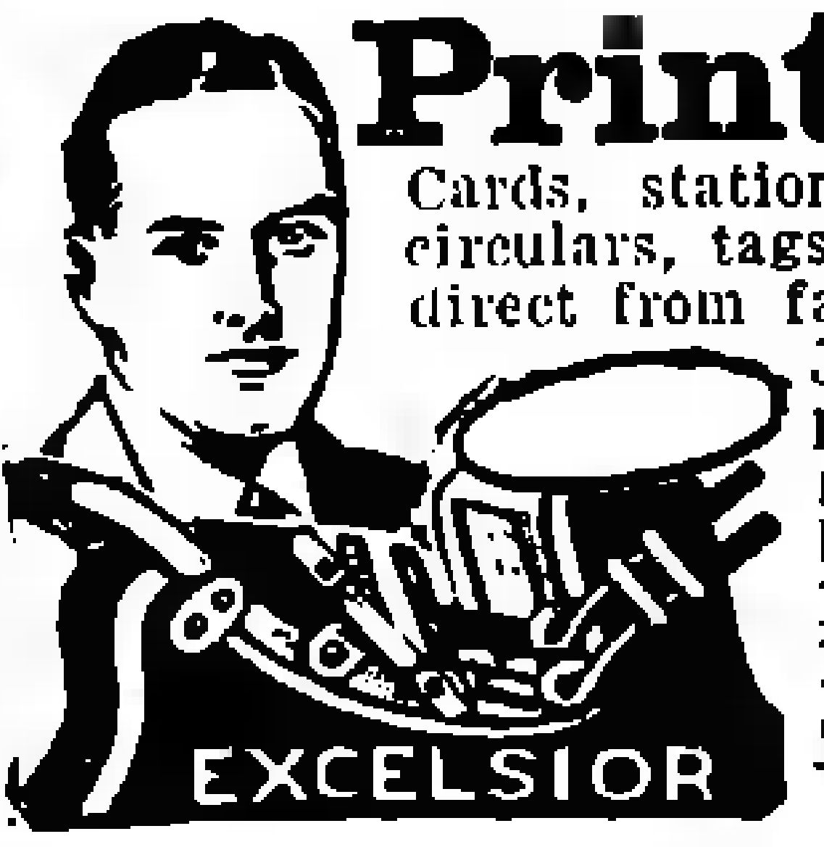

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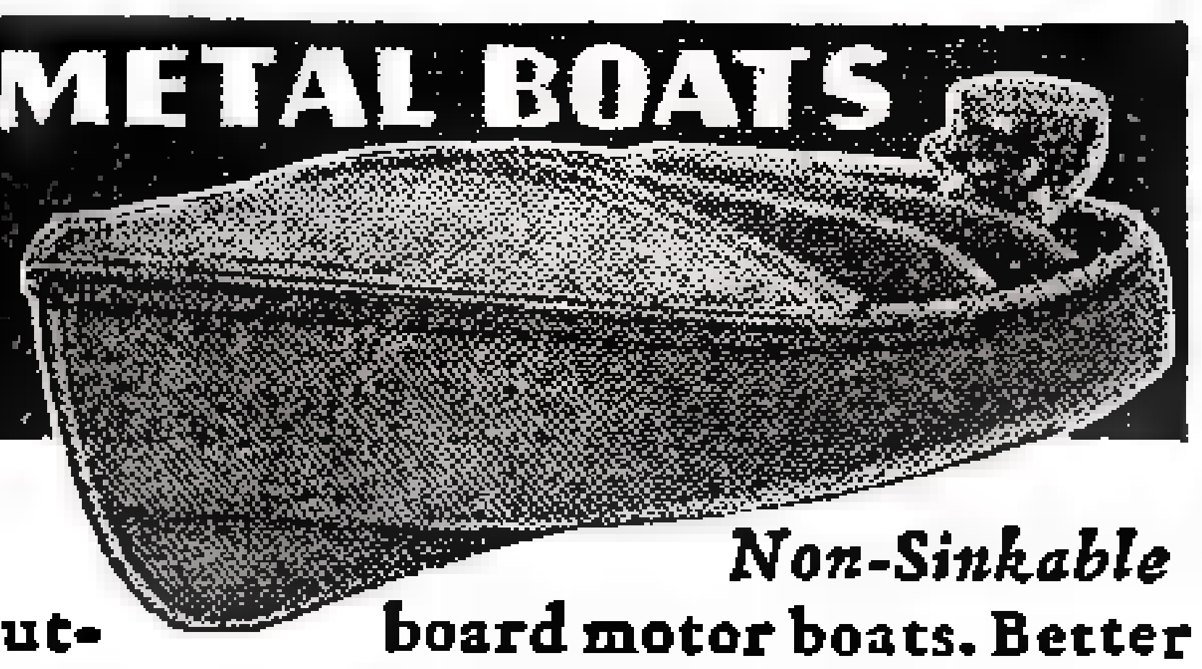

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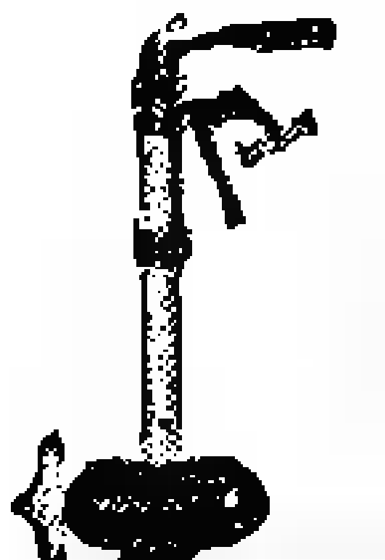

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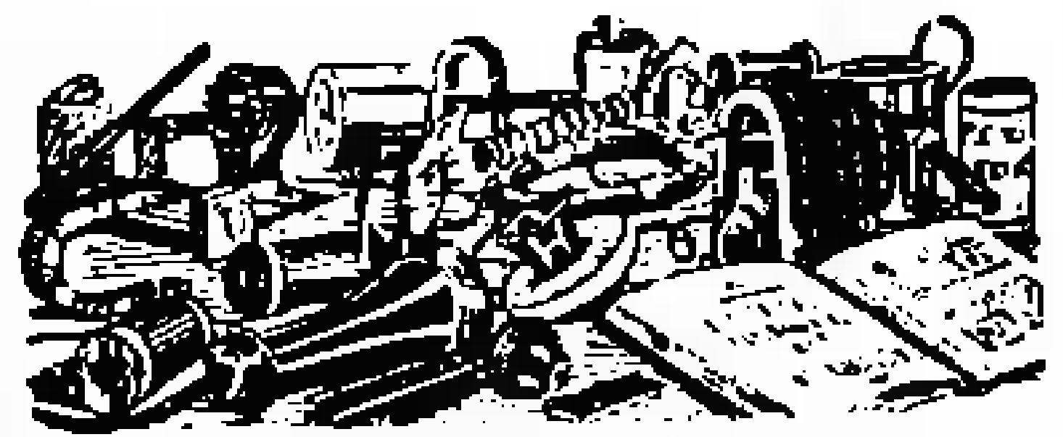

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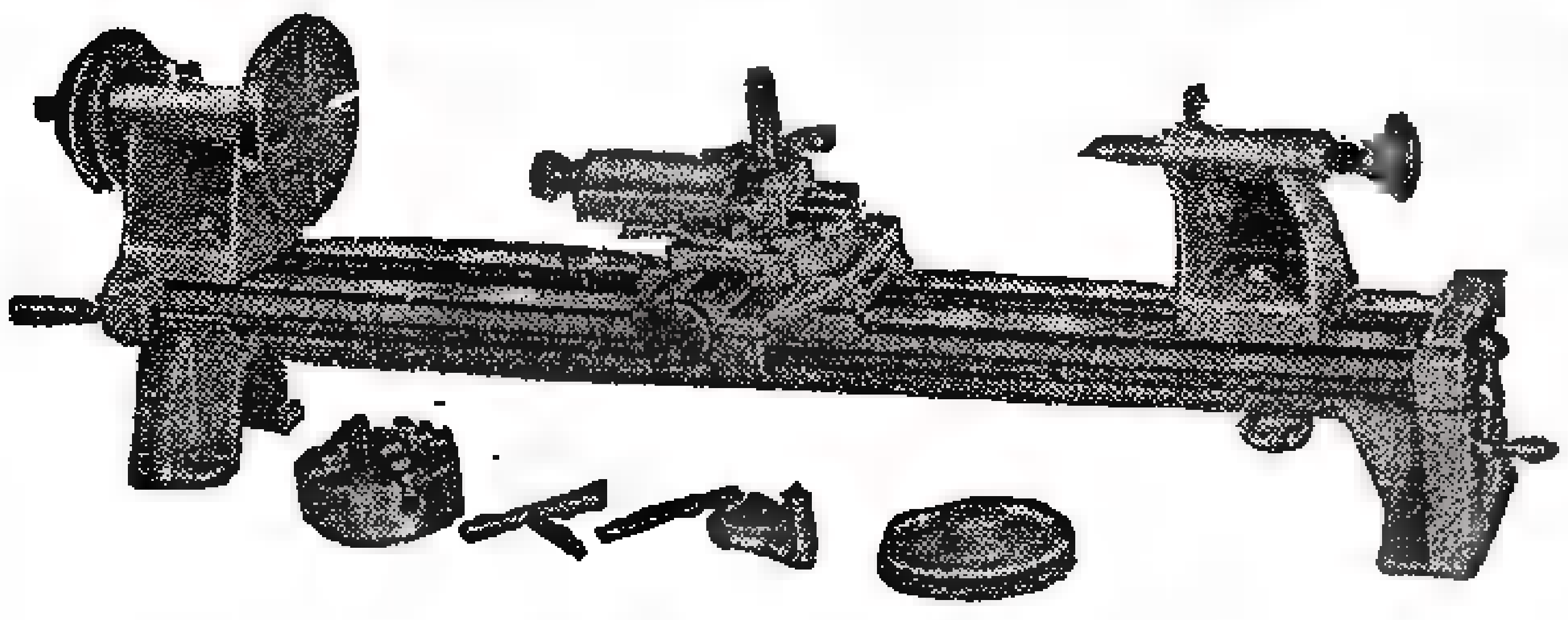

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INVENTORS

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Pages 10 and 11

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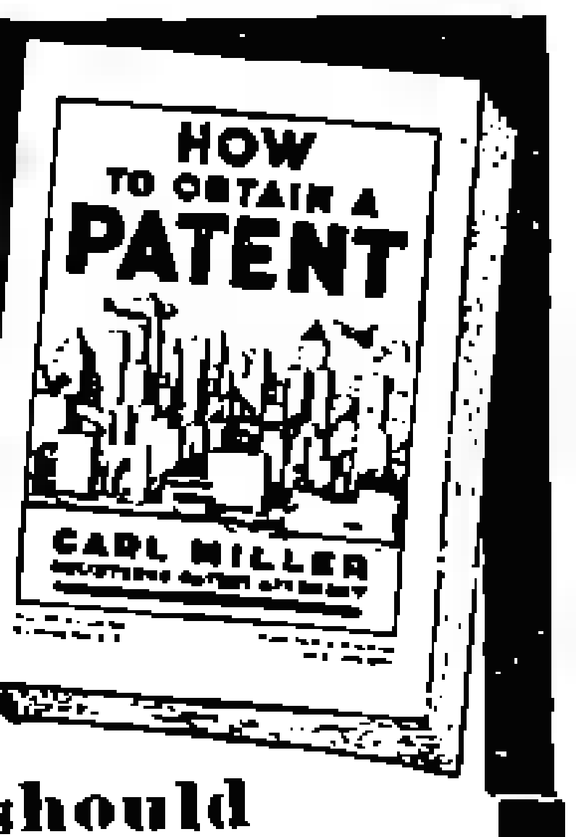
HOW TO OBTAIN A PATENT
CARL MILLER

HOW TO OBTAIN A PATENT written by a Former Member of the Examining Corps (1922-24) of the U. S. Patent Office. If you want to profit by your idea, you should take steps to apply for a U. S. Patent at once. Your first step is to get this Free Book. This interesting illustrated book contains valuable information you should have. It tells you fully how to obtain a patent on your idea in the quickest way. With this Free Book you will also receive a "Record of Invention" form on which you can easily record your idea. Personal and Confidential Service: Your Case will be personally handled only by a Registered Patent Attorney who is also a Former Member of the Examining Corps of the U. S. Patent Office. All communications will be strictly confidential.

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[*Continued from page* 77]

probably can see a way in which these ideas can be improved, and certainly you have equally simple ideas concerning other fields.

For years the manufacturers of perfume have been looking for a new and better method of stopping perfume bottles. Due to the high alcoholic content of perfume a perfect and leak-proof method of bottle stoppage must be had.

The inventor who can devise some sort of a magazine powder puff will also realize a great fortune. Not only is a great deal of powder wasted with the present puffs but powder is also dusted over the surfaces adjacent to the powder box.

There is also needed some sort of a finger-fitting form that will permit the rapid application of nail polish. At the present time this material has to be painted on with a great deal of care.

A light-weight triple mirror of the hand type with the two side mirrors easily adjustable would fill a large need. The invention involved here would be that of finding the right sort of a hinge with which to hold the two side mirrors to the center mirror.

Those inventors who are lending their ear to the complaints of ladies are hearing an increasing number of complaints concerning lip sticks and eyebrow pencils. Many women like to expose a considerable portion of the stick when it is used and under these conditions, the sticks will often break off. Some method of preventing this is needed.

RULES

1. In 100 words or less explain your idea for a needed invention.
2. This contest is open to everyone except employes of Modern Mechanix Publishing Co., and members of their families.
3. You don't have to buy a copy of this magazine or be a subscriber to enter the contest.
4. Write your name and address plainly on your entry. No entries will be returned.
5. The editors of this magazine will be the judges. Their decisions are final.
6. Mail your entry to Inventions Contest Editor, Modern Mechanix Publishing Co., Greenwich, Conn. Entries for this month's contest must be postmarked on or before May 1, 1936.

HELP FOR INVENTORS

The Editors of MODERN MECHANIX AND INVENTIONS MAGAZINE are always ready to assist inventors with their problems to the best of their ability. Since thousands of letters are received from readers each month, the editors can not devote the time to make a thorough explanation or to do extensive research in reply to each letter. For more complete information on any problem of inventions and patents, we suggest that inventors write to the various firms advertising in this magazine that specialize in your particular problem.

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Turn patented or unpatented ideas into cash with this new book, **Inventors' Selling Guide,** by Raymond F. Yates, who has helped over 30,000 inventors. Nothing else like it—gives classified list of nearly **1000 manufacturers who buy ideas,** tells how to protect ideas without patents, how to sell chain stores, price inventions, etc. Covers **Proved Methods of Selling, Finding Buyers, Royalty Contracts, "Rackets" to Avoid, Selling Patents Pending, Financing, Selling Unpatented Inventions,** many other vital topics. Cloth bound book, 224 pages, postpaid $2 (or C.O.D., $2.12). Satisfaction guaranteed.

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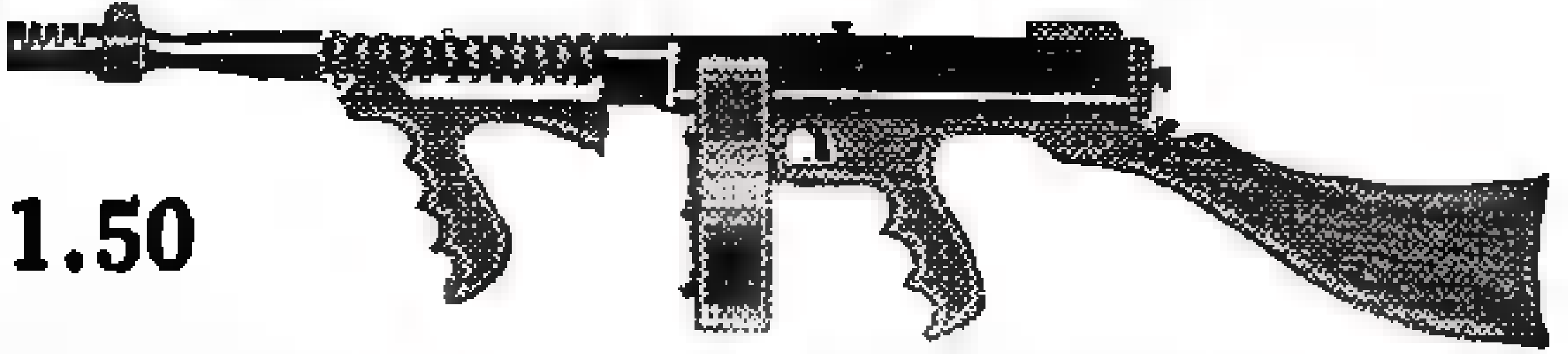

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INVENTORS

and

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Can You Answer these Questions?

●

For the answers to these questions and other information of value to you, look on page 18.

1. What is the only effective way to protect an invention?
2. What is first step in making application for patent?
3. How many patents were issued to Thomas A. Edison?
4. To what president was issued patent for expanding air-chambers to lift river boats over sand bars?
5. How many years does a mechanical patent remain in force?
6. How does the issuance of a patent protect the inventor?
7. Is it compulsory to prepare a working model before making application for patent?
8. What is a "Record of Invention" form?
9. Why does the Patent Office advise applicants to employ registered patent attorneys?
10. When can an article be marked "Patent Applied For"?

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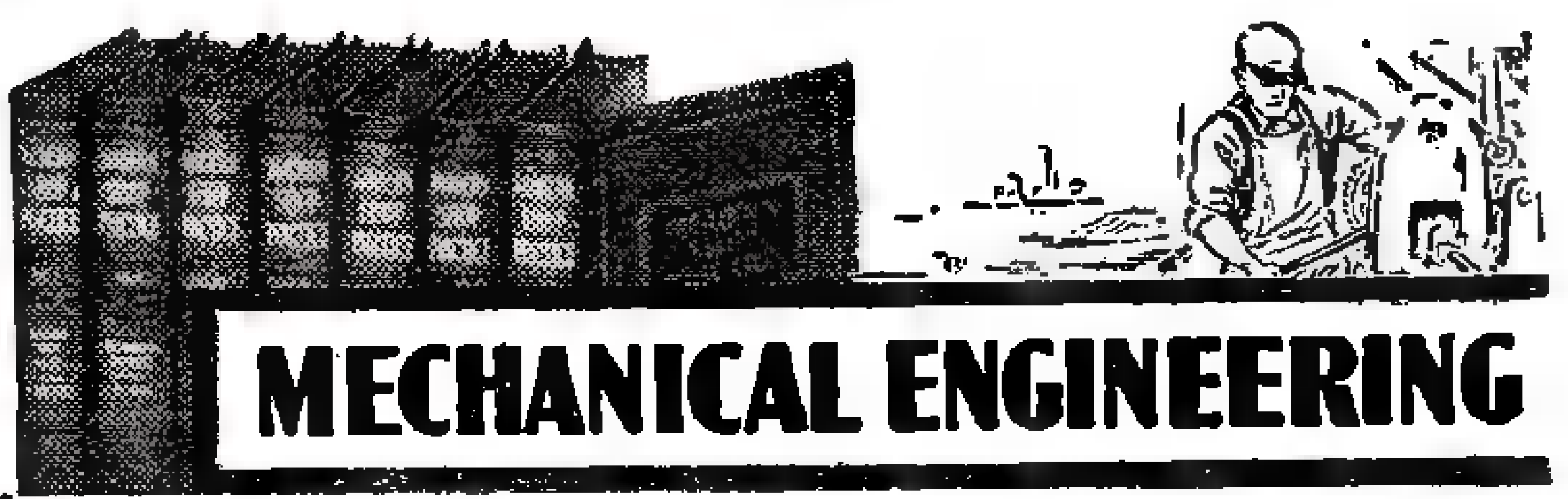

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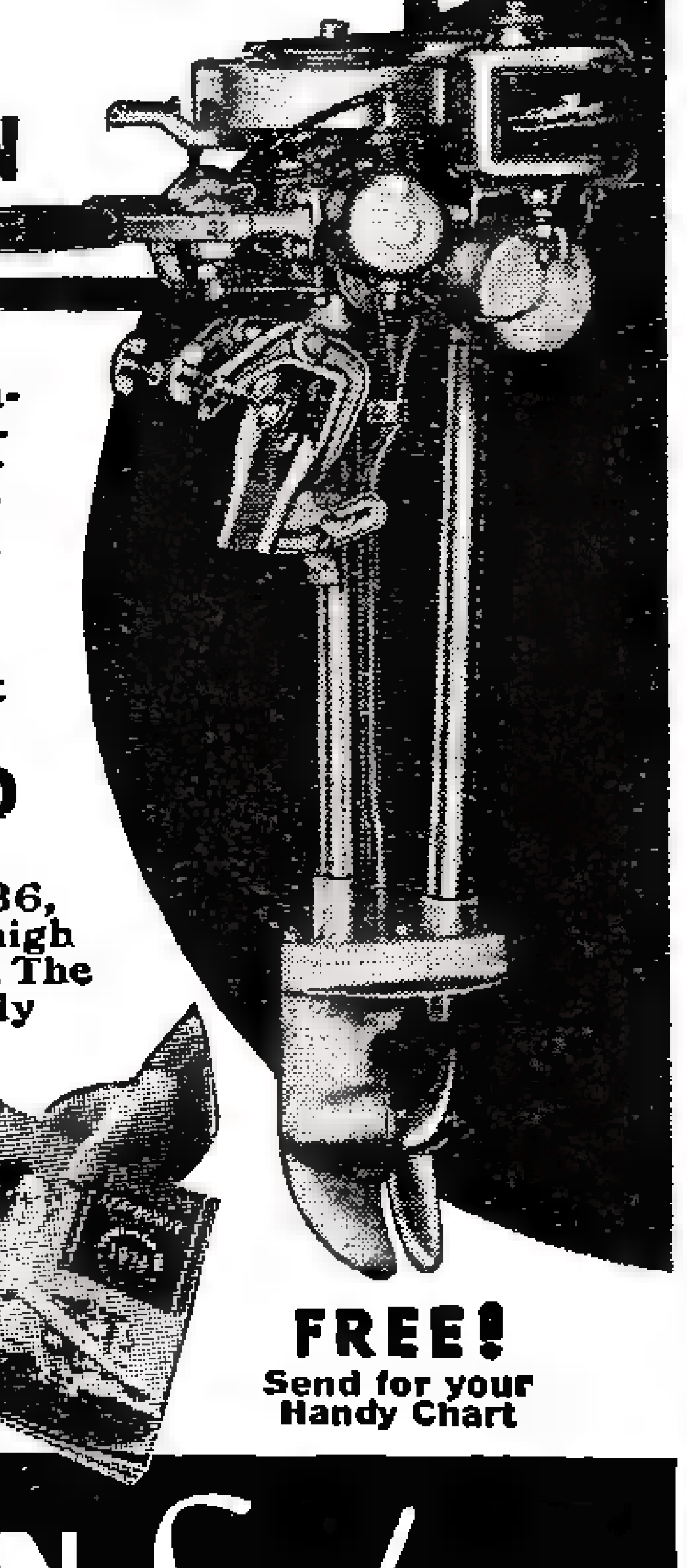

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JOHNSON *Sea-horse*
OUTBOARD MOTORS

Outshooting the Guns of Gangland

[*Continued from page* 61]

indicates how each man has scored. A bull's-eye counts ten; the outer rings, from nine to five each. An officer must score an average of two hundred points from the forty qualifying shots to earn his "shooting money."

Up from the pits jumps a new set of targets. They are silhouettes—life-size drawings of phantom criminals, with the vital areas outlined in white. The marksmen make five heart shots, then five head shots; next, five disabling shots—three in one arm, two in the other; and finally, five abdominal shots. Sergeant Joe Dirks unconcernedly asks Officer Naoka to poke a few holes in the target, near the heart, and the officer obliges by placing a circle of tiny perforations in the very center of the heart outline, although he is shooting with a strange .38 revolver at a range of twenty-five yards.

Steady practice has had its result, for the police pistol team has won every state, national, and international shoot in which they have competed in the last five years. Their sharpshooting has been largely instrumental in throwing a wholesome fear of police guns into the underworld. Largely on this account, crime records in Los Angeles for last year showed a reduction of 38% in the number of robberies, 28% in burglaries.

Wells Photographs Into Future

[*Continued from page* 127]

foods are stocked, and a chemical atmosphere is manufactured within the chamber.

And then—the terrible concussion!

In an observatory high above Everytown, Cabal and Sir Raymond stand staring at a great telescope mirror, similar to the 200-inch mirror to be installed at Mt. Wilson. A tiny streak of moving light marks the trail their children are blazing in history.

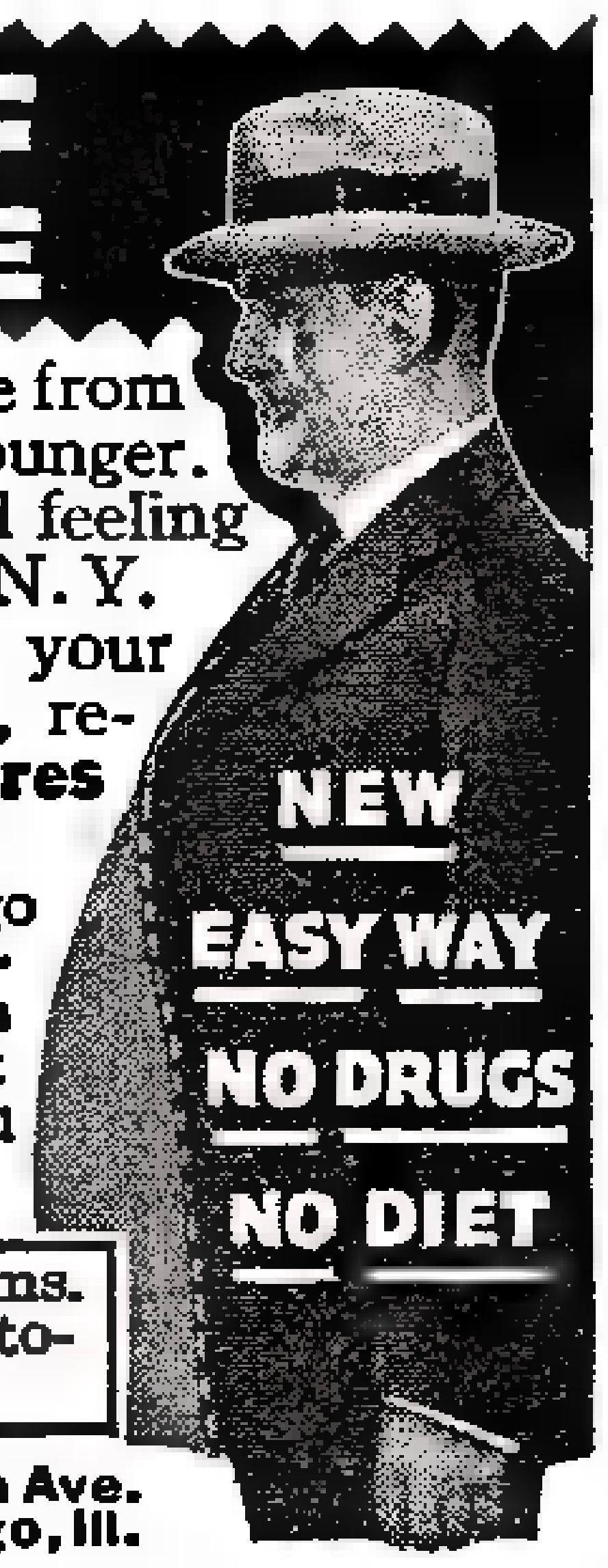
"My God! Is there never to be an age of happiness? Is there never to be a rest?" Passworthy chokes.

"For man, no rest and no ending," says Cabal, the scientist incarnate. "He must go on—conquest beyond conquest. All the universe—or nothingness. Which shall be it, Passworthy?"

Like the sombre voice of Fate from some illimitable bourne comes the echo: "Which shall it be?"

And on that note of query our master guide, H. G. Wells, ends his inspiring vision. He is content to leave us with a picture of science and invention marching to their resistless ends, as they are marching as you read these words. Marching with such accellerated swiftness as to make his world of 2054 a too-conservative promise of wonders yet to come!

8 INCHES OFF WAISTLINE



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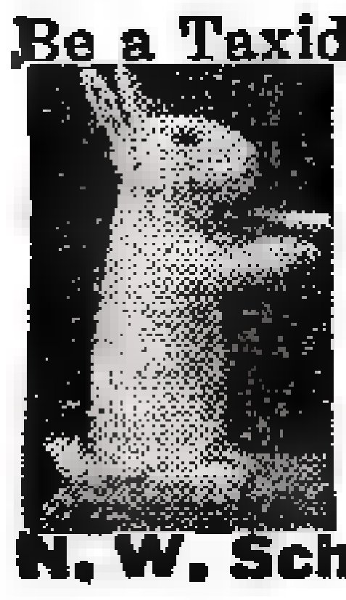

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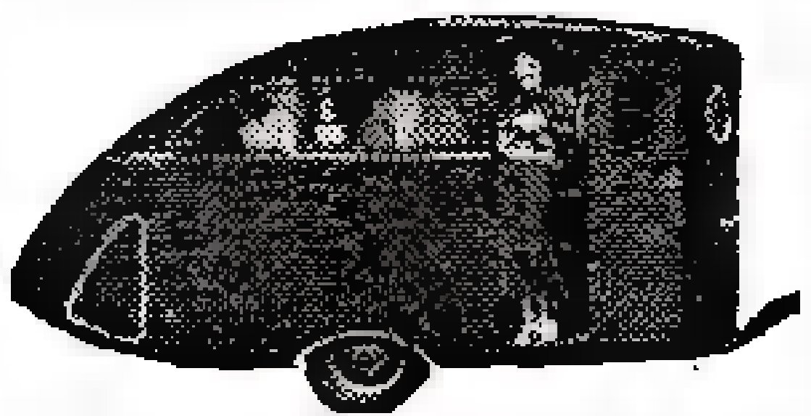

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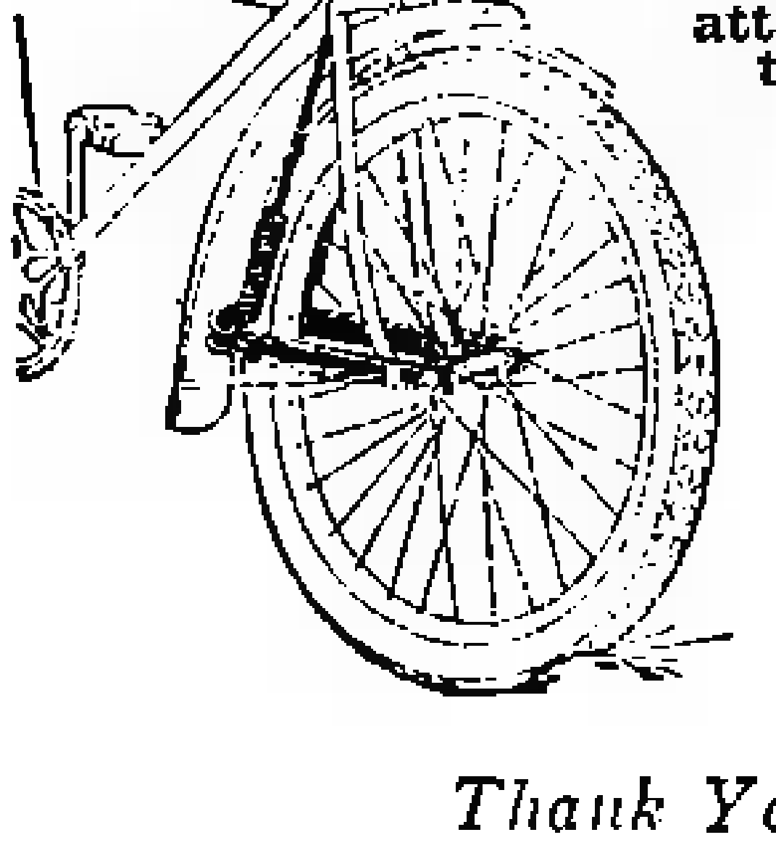

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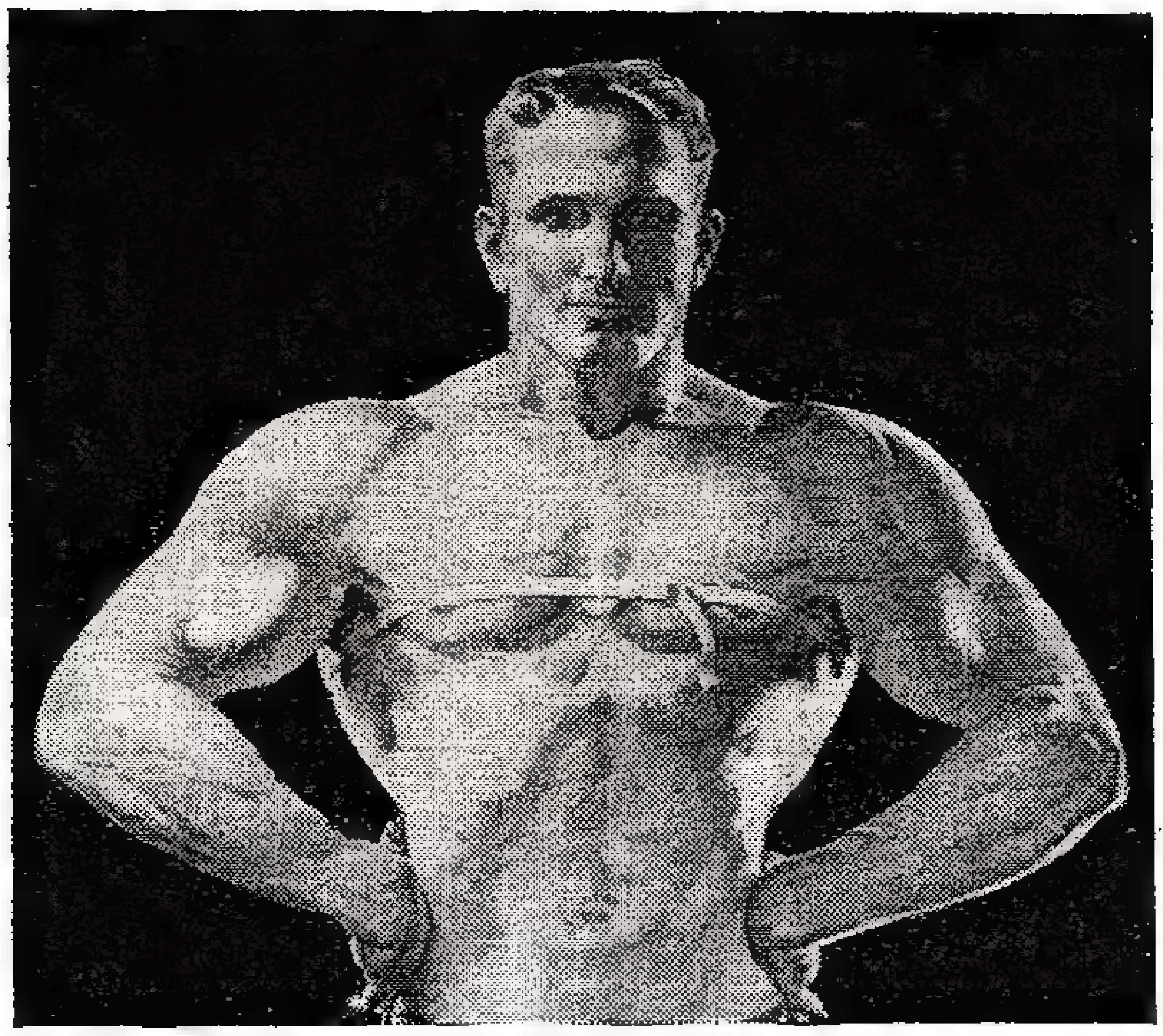

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—*Signed*: GEORGE F. JOWETT.

THREE SOLID INCHES of muscles added to your chest and at least two inches added to each of your biceps, or it won't cost you a penny. I know what I am talking about. . . . I wouldn't dare make this startling agreement if I wasn't sure I could do it.

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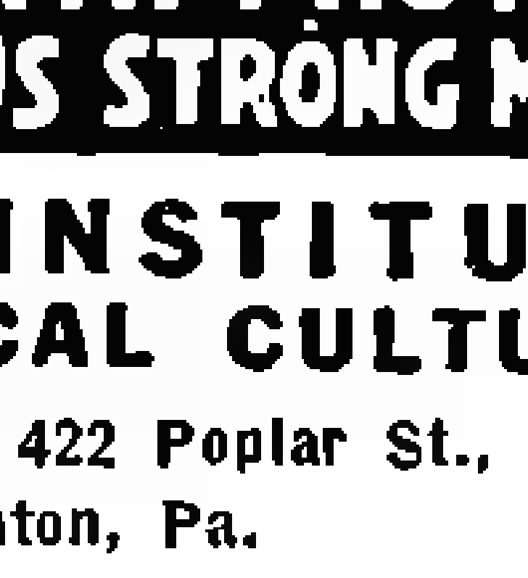
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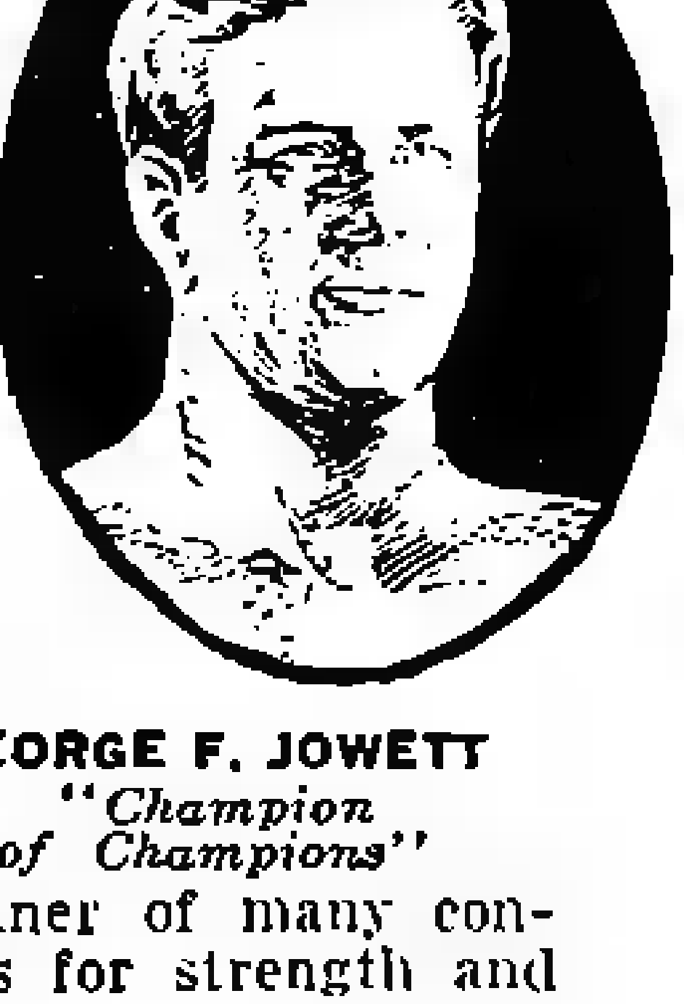

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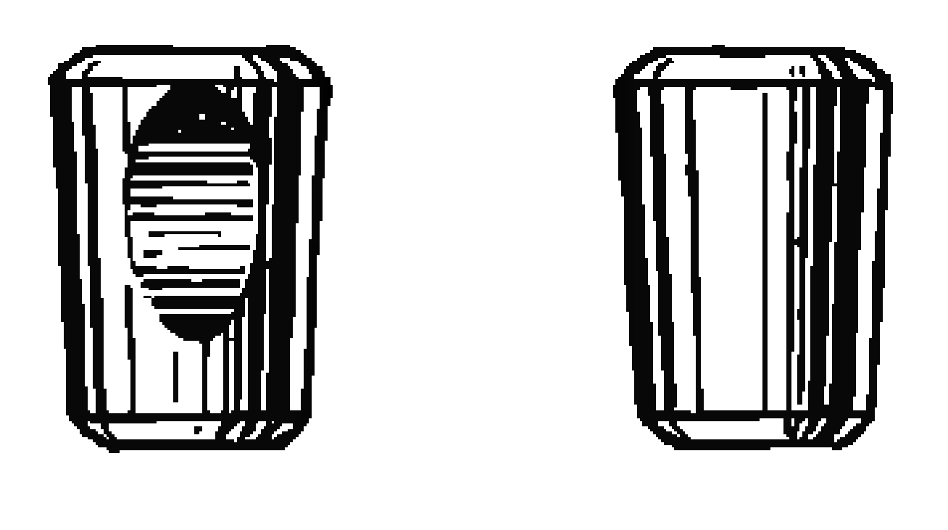
Cost Average Motorist $82.20 YEARLY

The National Automobile Chamber of Commerce states that the average car owner spends $82.20 for motor repairs caused by oil failure. Automotive Engineers in an effort to overcome this expense, find that friction is their greatest foe. Particularly is this true in the modern high speed motors.

SAVES REPAIRS AND OIL



Bearing run in untreated oil burned out under 16,000 pounds of pressure.

Bearing run in same oil treated with COLGRA withstands 20,000 pounds pressure.

A new discovery called COLGRA SUPERFILM creates a film strength so great that friction is reduced to a minimum and helps eliminate many expensive motor repairs. In actual tests conducted with Standard SAE Timken Bearings, on a Weeks' testing machine using the best grade motor oil treated with COLGRA SUPERFILM shows three to five times the film strength as the SAME OIL UNTREATED. Users praise COLGRA and tell of big oil and motor repair savings.

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"Old Town Canoes"

America's Appetite for Games

[*Continued from page* 41]

looming, it looked like a natural. He immediately set to work, and before long had devised a game based closely on a national presidential election.

Presidency Is Goal of Politics

The task in Politics is to general one's forces cunningly, and to keep careful check on the entire nation so that one may win 266 votes, the electoral majority, and thus be made president.

"I wanted to make a game that would allow sociability," explained Mr. Lord, "and would thus be a refreshing change from such conversation-killing pastimes as contract bridge."

Some games allow interest to flag because only one player can play at a time, thus reducing other contestants to mere bystanders until their turn comes. Not so are Monopoly or Politics. While the player is not casting dice, levying rent or winning counties, he will do well to survey the progress of play and adapt changes to his own advantage.

For a time the new game of Politics was jeopardized by a shortage of seemingly trifling things—pins. Each game requires a hundred different-colored pins with which players mark off the areas they have won. As orders began to stream in, Mr. Lord suddenly found he needed pins—millions of them. Soon he had scoured New York and bought every available pin. Still he could not keep pace with demand, and production of Politics was seriously curtailed until arrangements had been made with a factory to supply the vital pins.

Public's Taste Is Big Riddle

The invention of games offers an attractive field for those of analytical minds. What does the public want? One who can answer that question holds the key to riches; but it is a hard question to answer. Inventors who have been successful with one game have found to their chagrin that their next offering grew moldy on salesroom shelves. Yet one can post a few rules which most successful games have observed. Perhaps the most vital is that the subject of the game must have wide and general interest. A game based on thermodynamics could hardly be expected to appeal to housewives.

The balance between chance and skill is an important factor. Too strong an element of chance makes a game that requires little thought, and is consequently relegated to the nursery. Yet at least a small ingredient of chance is essential—it eggs one on to take risks, and produces greater excitement.

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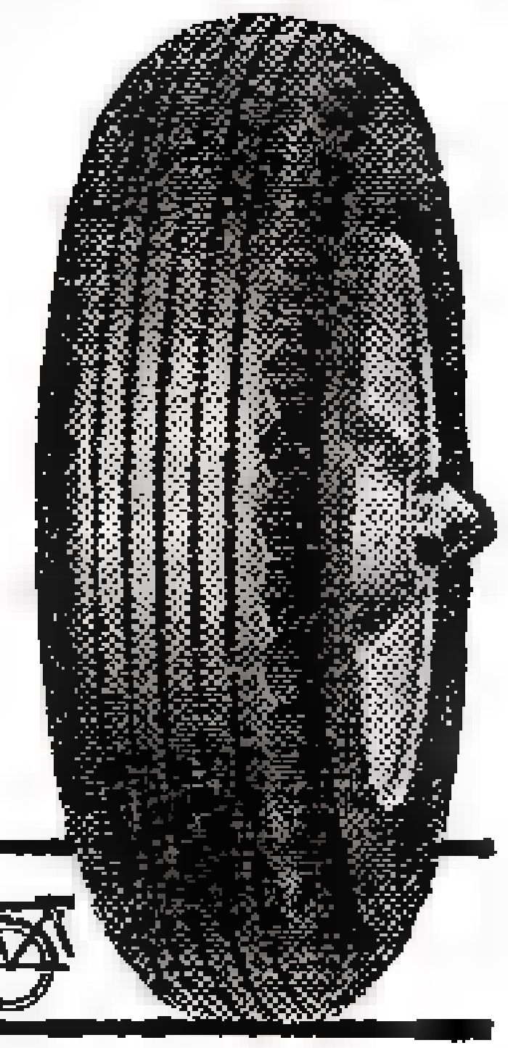

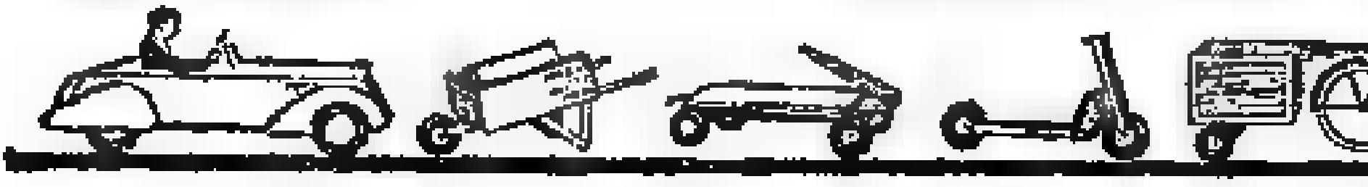

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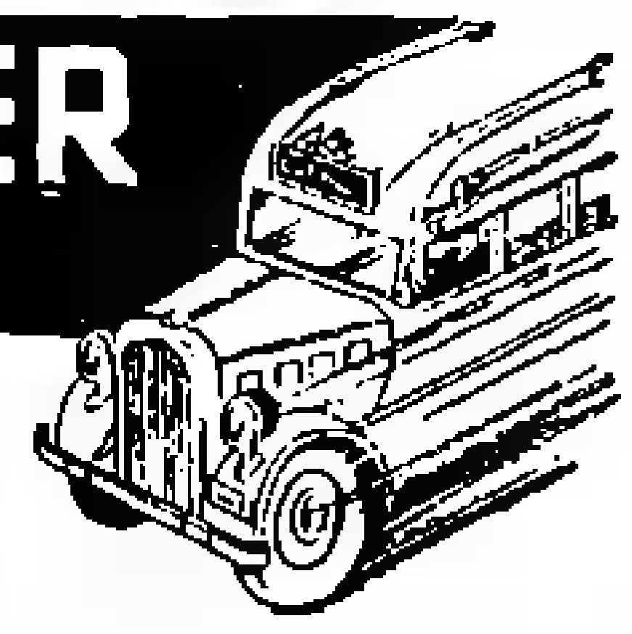

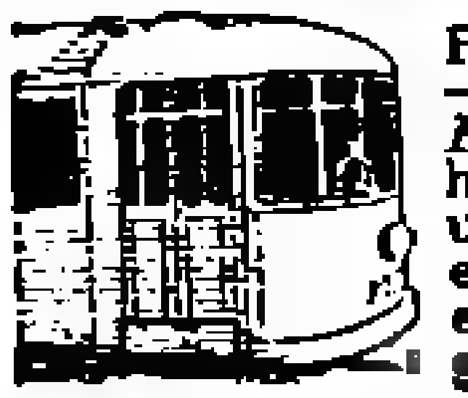

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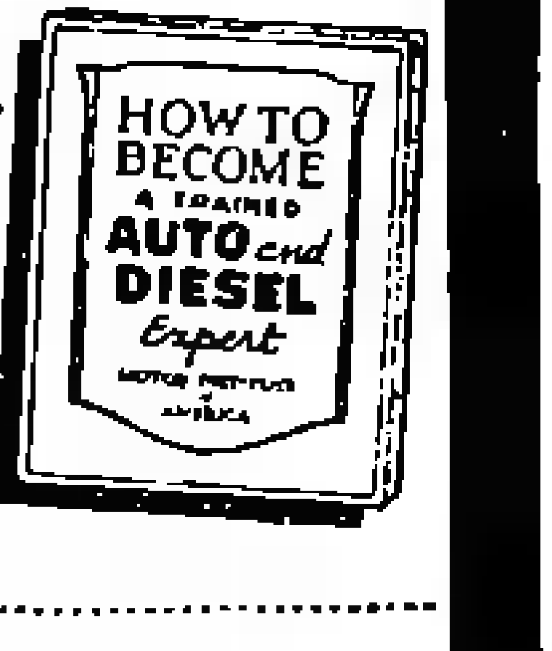
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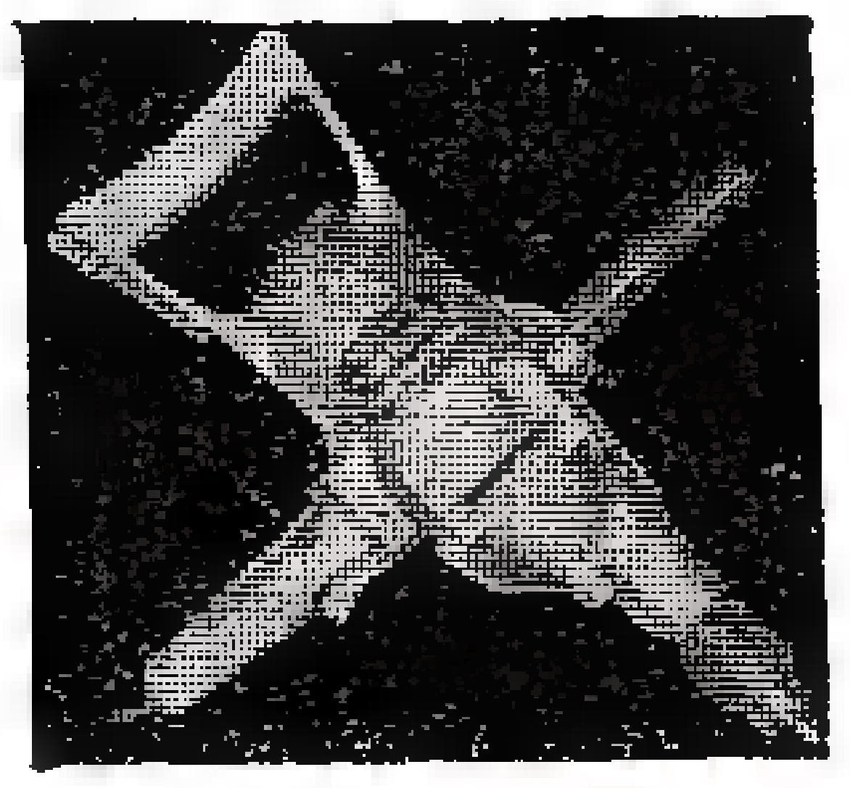
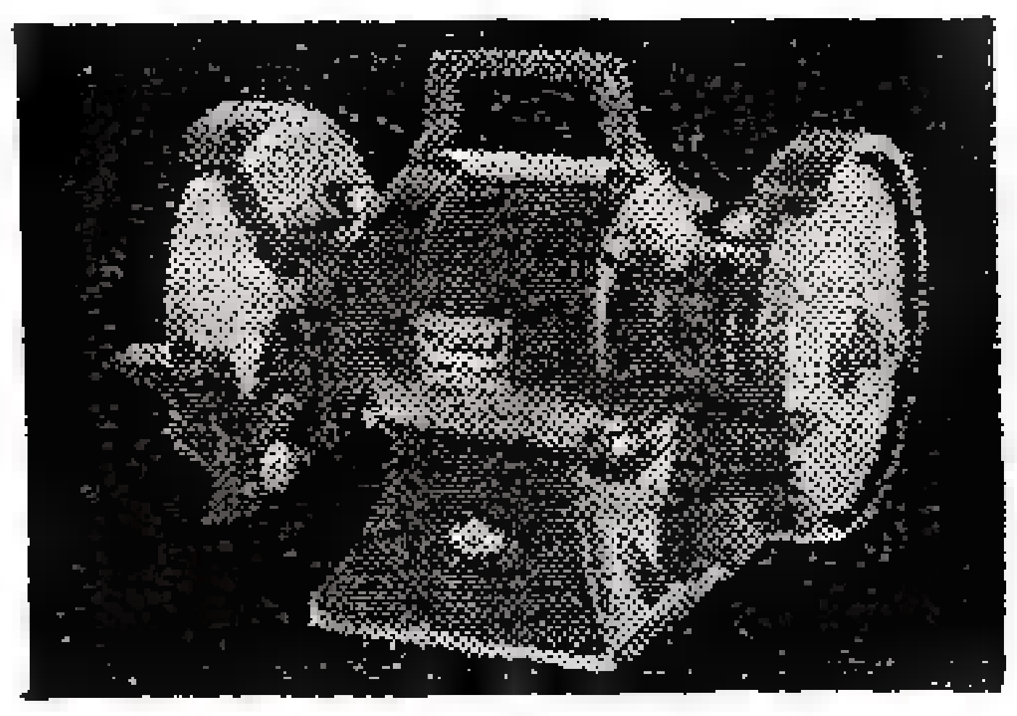


NEW ½-INCH JUNIOR DRILL—capacity up to ½-inch in steel; 1-inch in wood. Also drives hole saws for cutting clean, round holes up to 3½-inch diameter in any material a hack-saw will cut. Powerful Universal motor. A handy tool—at an amazingly low price. **$35.00.**



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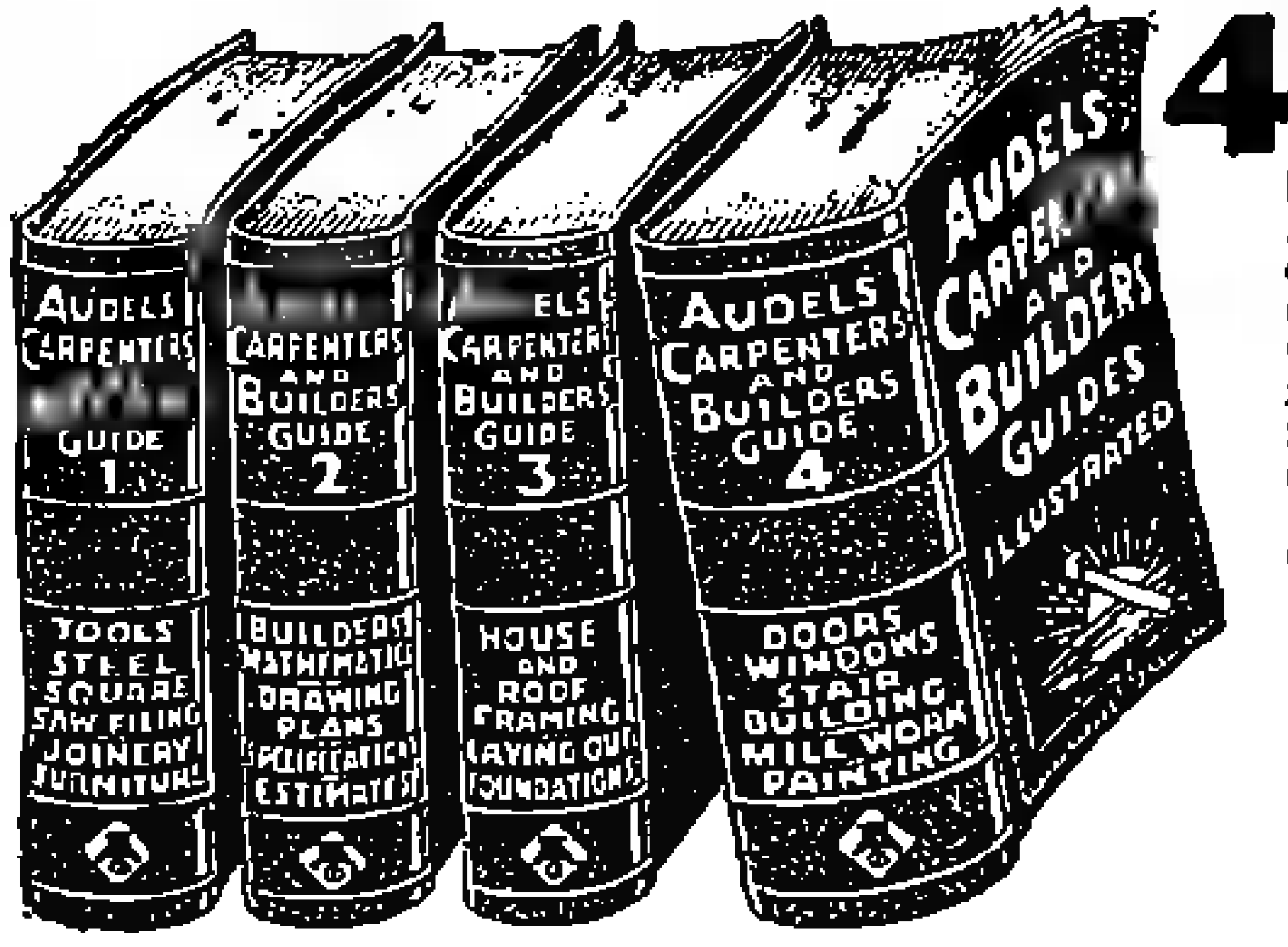
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He Made Sky Mapping Big Business

[*Continued from page* 46]

central lens takes a vertical photograph, while the other four lenses simultaneously take oblique shots. The five prints are assembled into one group in the shape of [illegible] Maltese Cross (see diagram).

While pilots and photographers ride their aerial pendulums, the ground crew swarm scorpion-like to the control points. This work is very important because it makes positive the accurate piecing together of the individual photographs to form the mosaic map. But securing the ground control points is costly, slow and hazardous work, for the Rio Grande country is mostly on edge.

When the photography work is completed, the films are developed and a set of contact prints turned over to the engineering department. The scale ratio of each print is carefully figured to the known distances on the equivalent terrain. After any accuracies are corrected, the prints are re-photographed to a common, accurate scale.

The central portions of these corrected prints are then cut on lines which are determined by the ground contours and cemented down upon [illegible] composition base board, laid out with drawn pencil control lines worked up from previously gathered data. This master map is then rephotographed.

Floods—Winter's Aftermath

[*Continued from page* 65]

coastal inundations accompanying intense tropical hurricanes. However, by far the most common cause of all is the occurrence of unusually heavy storm rainfall or cloudbursts.

Cloudbursts of comparable intensity have occurred in Texas, in some of the East Gulf states, and at places along the South Atlantic coast of North America. But never in Nebraska. Actually, the Republican Valley storm was in [illegible] class with ones we read about in Hawaii, the Philippine Islands, India, and other regions of heavy precipitation.

Glendora, Oregon, is the wettest spot in America. Almost to a drop eleven feet of rain floods down there every year, no more, no less.

One of the most recent developments in the art of gaging flood flow is the use of automatic, radio warning equipment at critical stations. When the river surface reaches [illegible] dangerous height the radio automatically begins broadcasting code signals which tell the engineer at the central office the name of the station and the stage of the river. The engineer can then send hydrographers to the scene to measure the flood. He can also notify people living along the river valley of the impending flood danger; so that the flood losses can be reduced [illegible] much as possible.

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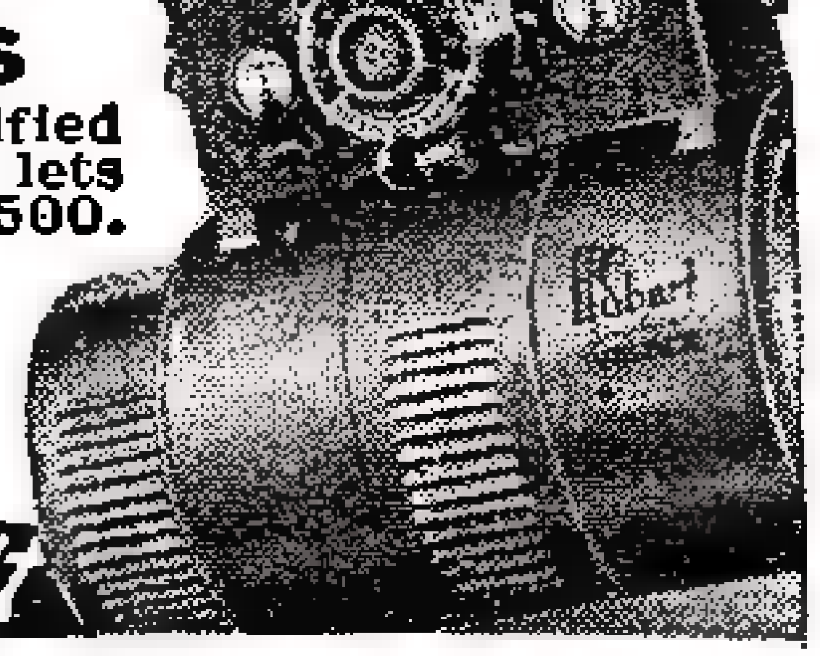

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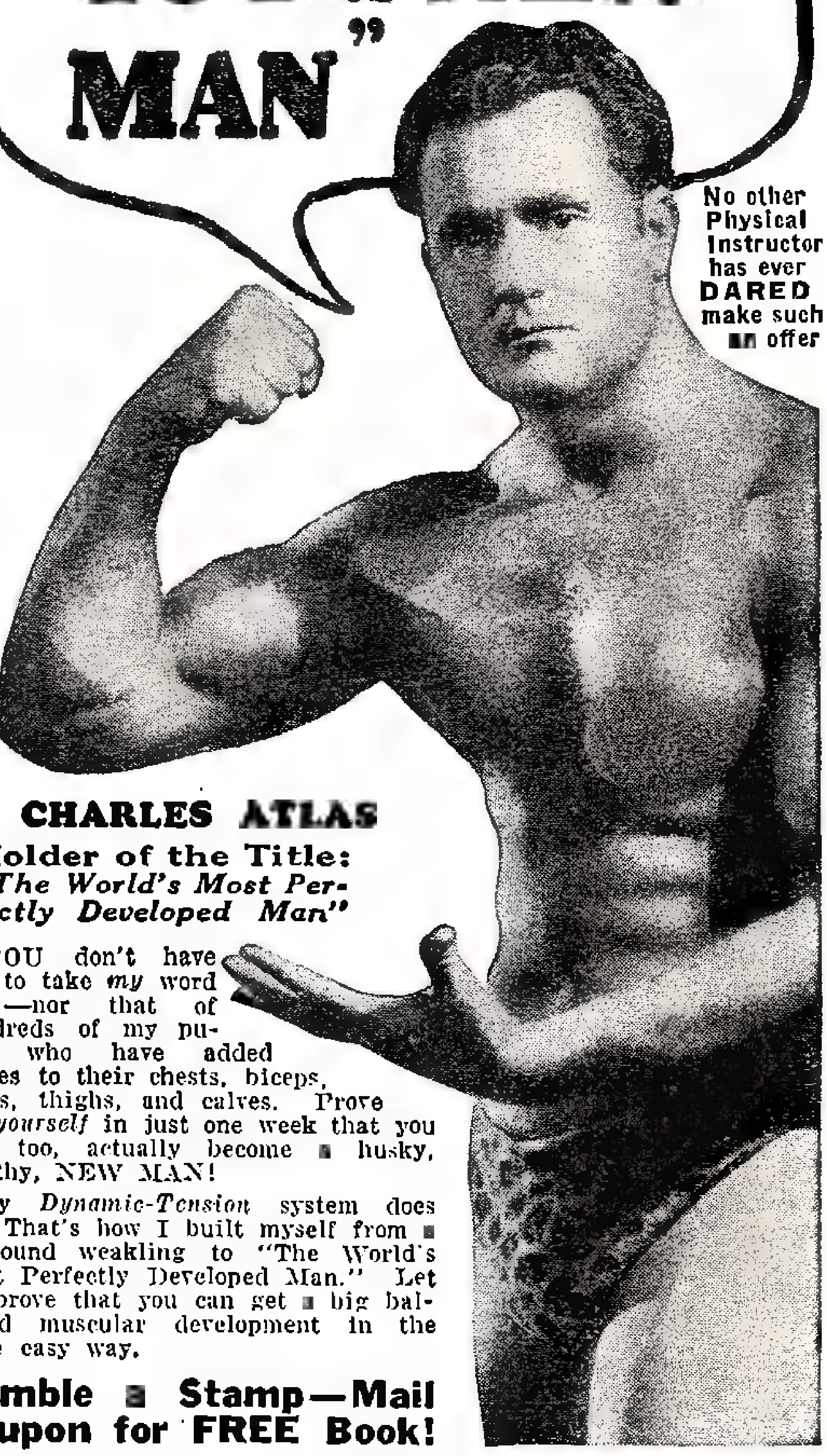

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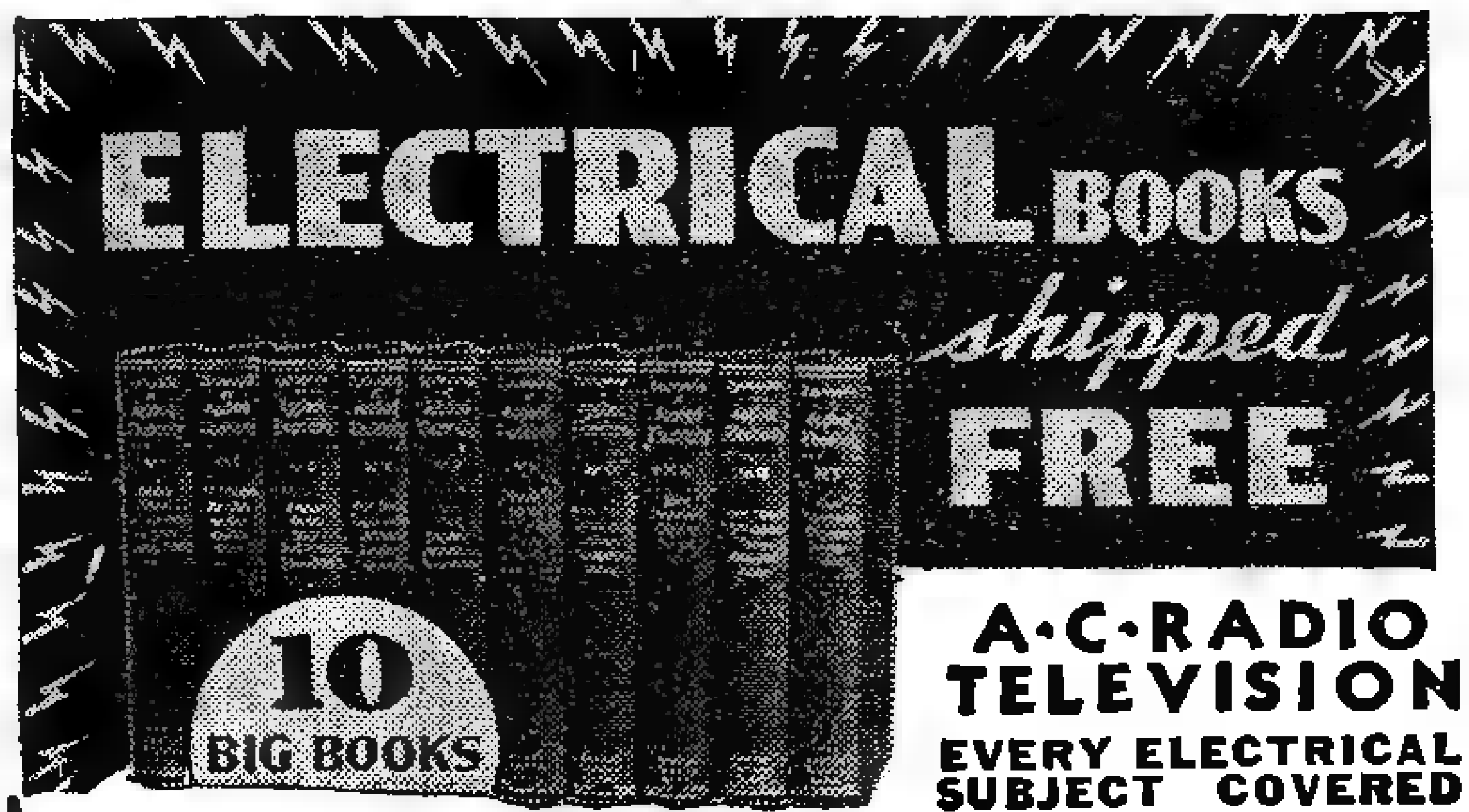

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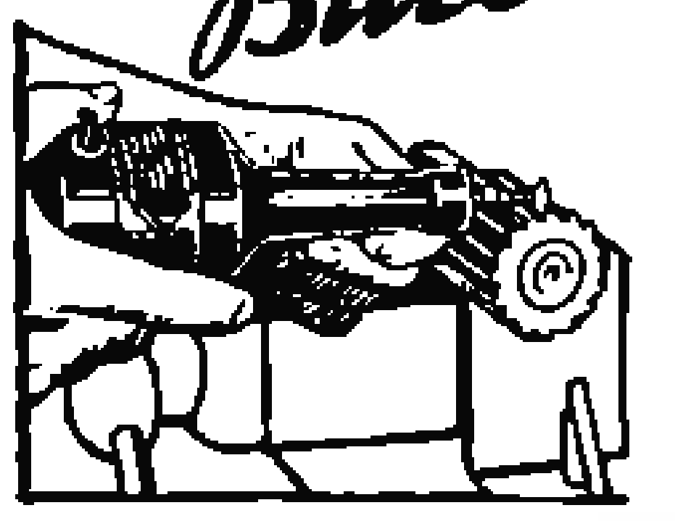
Please attach letter stating age, occupation and name and address of employer and at least [illegible] business man as reference.



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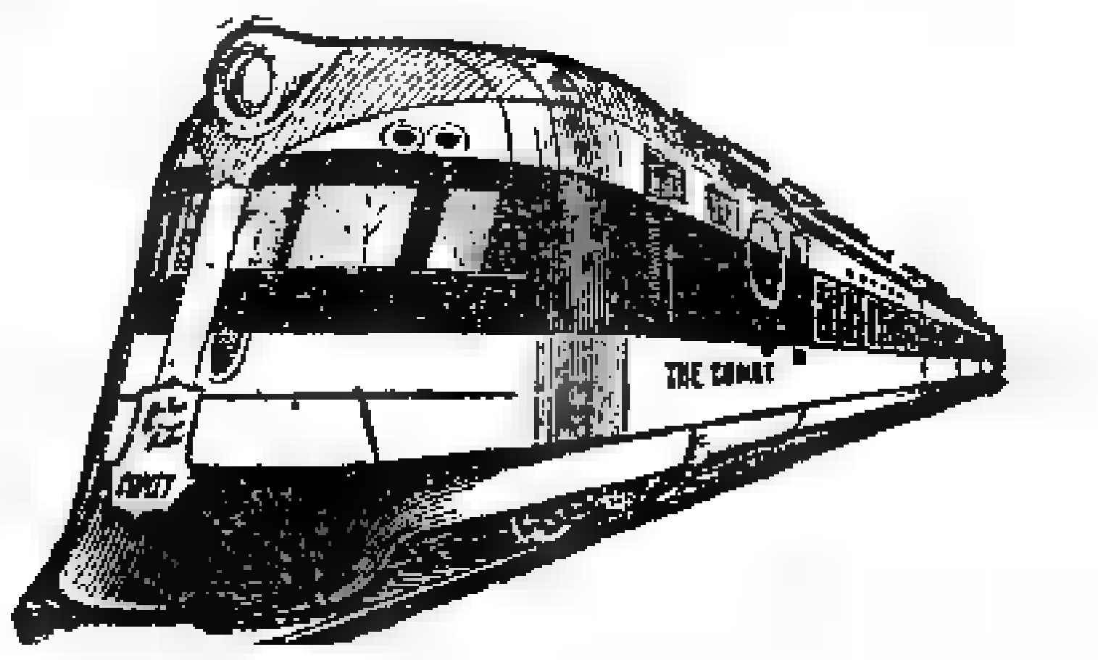

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Make These Novelties With Plastics

[*Continued from page* 122]

should be taken not to strike the thin edge of the plastic [illegible] it is apt to chip. This done, start the lathe and with a straight edge chisel, cut away the surplus lead.

Another project is the envelope and paper holder for the writing or business desk. This stationery holder requires two pieces of ¼-inch thick translucent plastic [illegible] inches long and 4 and 6 inches wide, respectively for the uprights. The rods are ⅜-inch in diameter and 4½ inches long. The feet are ½-inch square and 1 inch high.

After polishing the edges and surfaces of the uprights, they are laid together with the lower edges coinciding and [illegible] number of rubber bands stretched about them, then the holes for the rods are drilled. Apply cellulose cement to the adjoining surfaces.

If desired the holder can be made into the complete unit shown by assembling on a walnut base.

"Chinook" a Midget Gas Engine

[*Continued from page* 128]

When engine is ready for assembly and testing, provide a mounting made of two flat pieces of wood, on which the gas tank is mounted together with the spark coil hooked to a 4-6 volt battery. The fuel is mixed in the proportion of 1 gill of S.A.E 40 per half-pint of aviation gas. A small amount of Pyroil is also good as it will prevent the engine from seizing.

A good timing device for such [illegible] motor when used in models is the Eastman Kodak Timer which can be mounted directly to actuate a small radio panel switch placed in the primary circuit.

The jacket is simple. Turn off the fins, and thread the outside top instead of the inside top. An aluminum collar $\frac{3}{16}$″ thick screws down outside the cylinder on to [illegible] brass sleeve, sectioned as per the drawing. Shellac will keep all joints tight. The head is of aluminum, [illegible] simple turning for the lathe, and the inside slide fits into the cylinder. The clearance should be $1\frac{25}{32}$″ from the bottom of the cylinder. Six filister head 2-56 screws, set with liquid gasket material, seal the head down. The water outlets are drilled top and bottom—top for outlet and bottom for intake.

BLUEPRINTS FOR *CHINOOK* ENGINE

Enlarged blueprints of all drawings appearing in this article will simplify the task of building this model gasoline engine. They are printed on tough paper suitable for rough usage in the shop and are available [illegible] $1.00 postpaid. Send your order for *Chinook*, Blueprint No. M-411, [illegible] Blueprint Dept., Modern Mechanix Publishing Co., Greenwich, Conn.

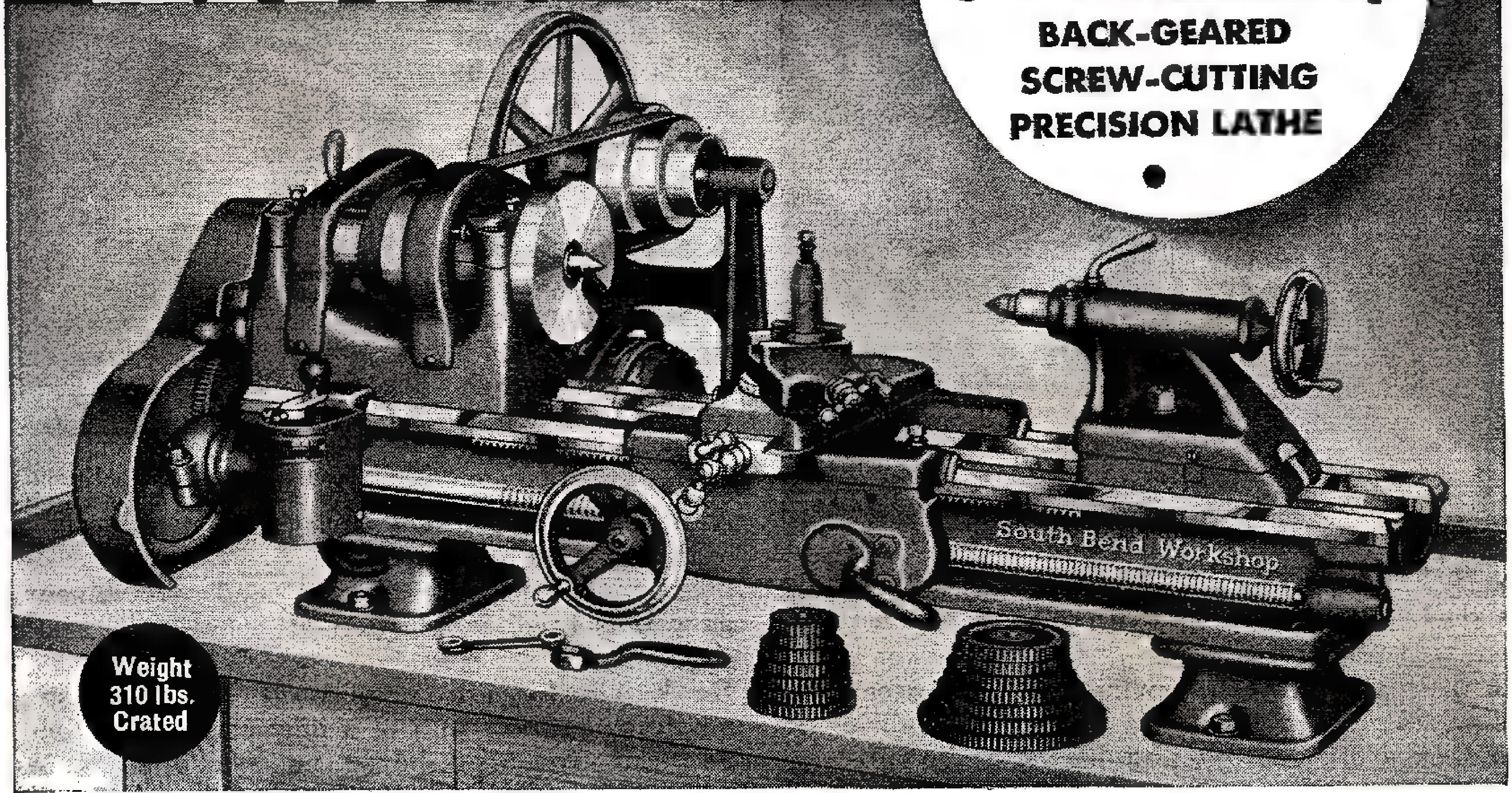
This New 1936 Model Genuine South Bend LATHE

$75.00

Less Motor Drive

9"x3' Workshop

BACK-GEARED SCREW-CUTTING PRECISION LATHE



NEW 1936 model 9⅛" x 3' Workshop Bench Lathe with Horizontal Countershaft, ¼ h.p. Reversing Motor, Reversing Switch and Belting as shown........ $98.25
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THE *new 1936 model* 9-inch Workshop Lathe swings 9⅛" over bed and 5½ over carriage. The hole through spindle is ¾" and will accommodate collets up to ½" capacity. The 3-foot bed size takes 17" between centers. Screw thread cutting range is 4 to 40 per inch right or left hand. Turning feeds as fine as .003" are provided for. Other bed lengths available are 3½', 4' and 4½' at slightly higher prices.

10 New Features of the new 1936 model include: (1) Twin Gear Reverse for Right and Left Hand Threads and Automatic Carriage Feeds, (2) Ball Thrust Bearing on Headstock Spindle, (3) New Improved Tailstock and seven other important improvements.

38 Practical Attachments, many of them new, are furnished for the 1936 Model Workshop for milling, grinding, draw-in collet chuck work, and other manufacturing and machine shop jobs.

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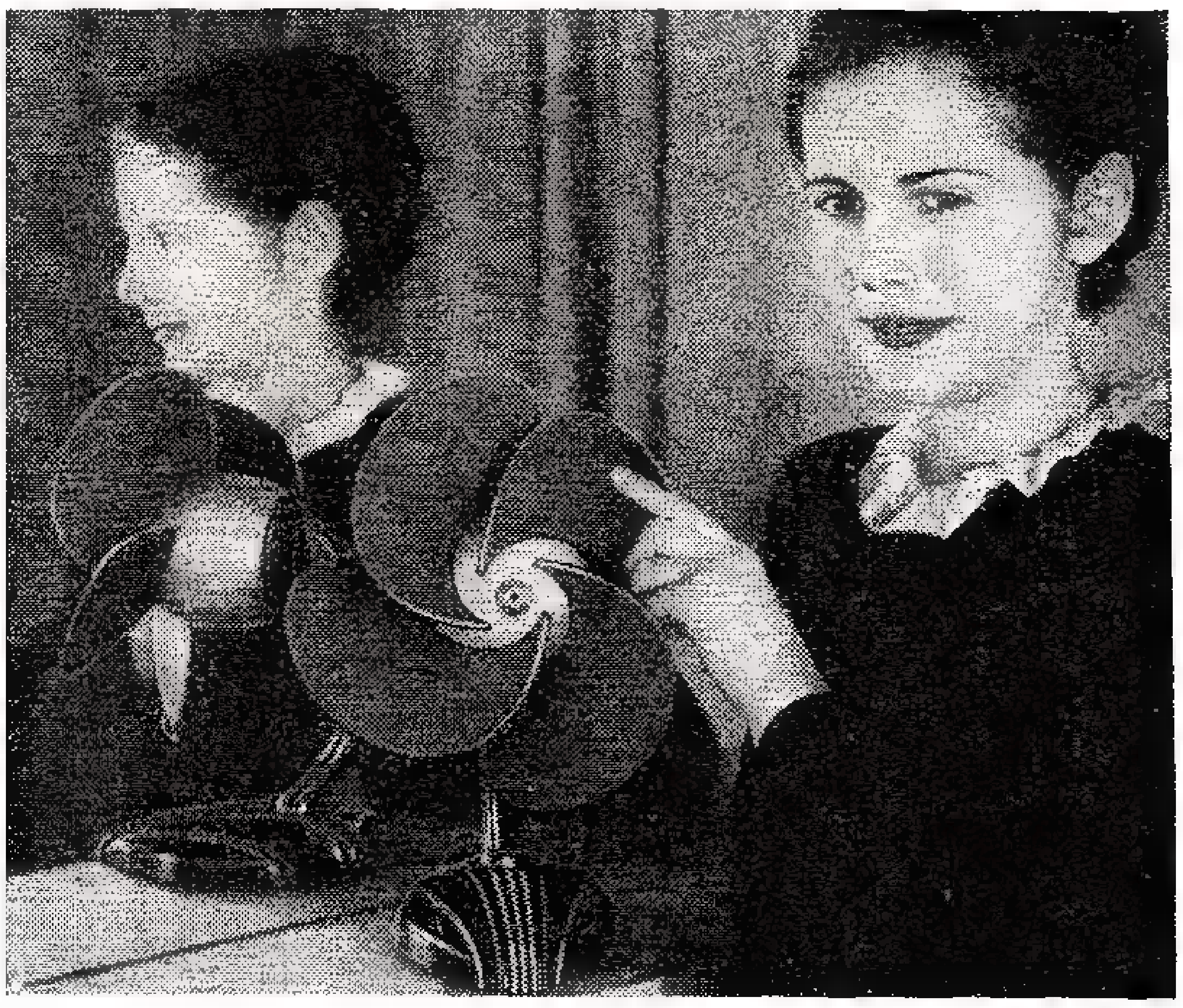


This is the newest of the electric fan family. Tough rubber blades direct a powerful flow of air but cannot injure even a child's fingers. It is noiseless and motor does not heat.

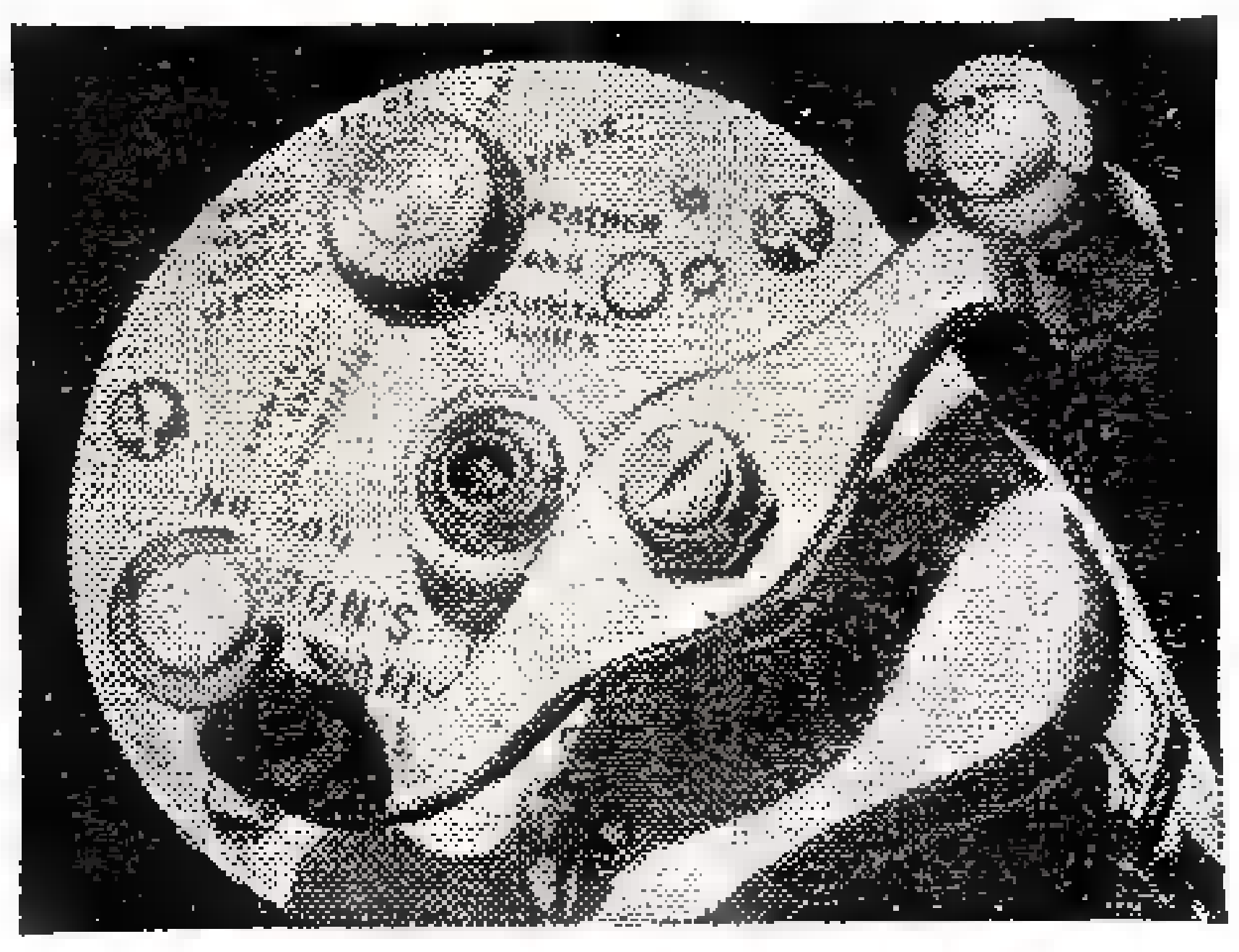
A new bit for use in sewing machines uses a jig saw action to cut wood, metal, or stiff fabric. It makes a smooth cut and leaves no sawdust or waste.

A master antenna system has been developed for apartment houses and hotels which permits any number of radios to operate from a single aerial.

A new resonance indicator employing an electron-eye tube can detect even a 5-megohm load in a circuit under test. It is small and self-contained.

A paint can is now available which fits connections on the spray gun. No paint is wasted when changing colors as one can of paint can be substituted for another.

A mechanical car parker lifts cars with special grips and hoists them to any upper level stall.



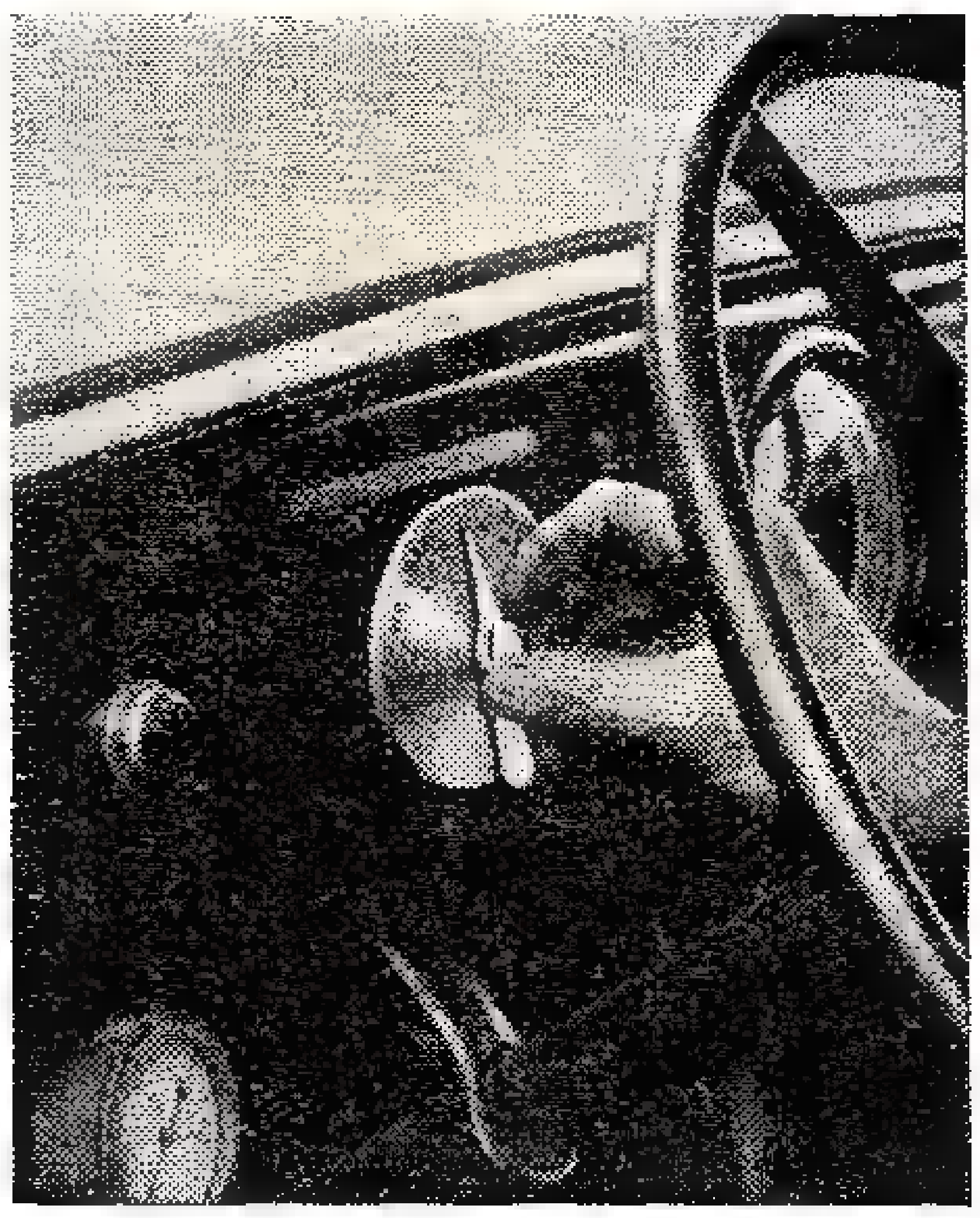
This new reel has a special bait casting adjustment feature. A thumb dial is set to the weight of the lure and reel brakes accordingly. No thumbing is necessary.

Dust cloths are now made of a special crinkled cloth which provides large wiping surfaces and pockets to hold the dust.

Gas powered model airplanes are now being built to scale of famous airplanes. They are crashproof.

A telephone holder for French phones swings in any direction and holds the phone in any position, leaving both hands free.

A five-watt amplifier for use on phonograph pick-ups and radio tuners has a high output level without hum.



Trailer brakes can be adjusted according to the load weight with this simple dashboard control.

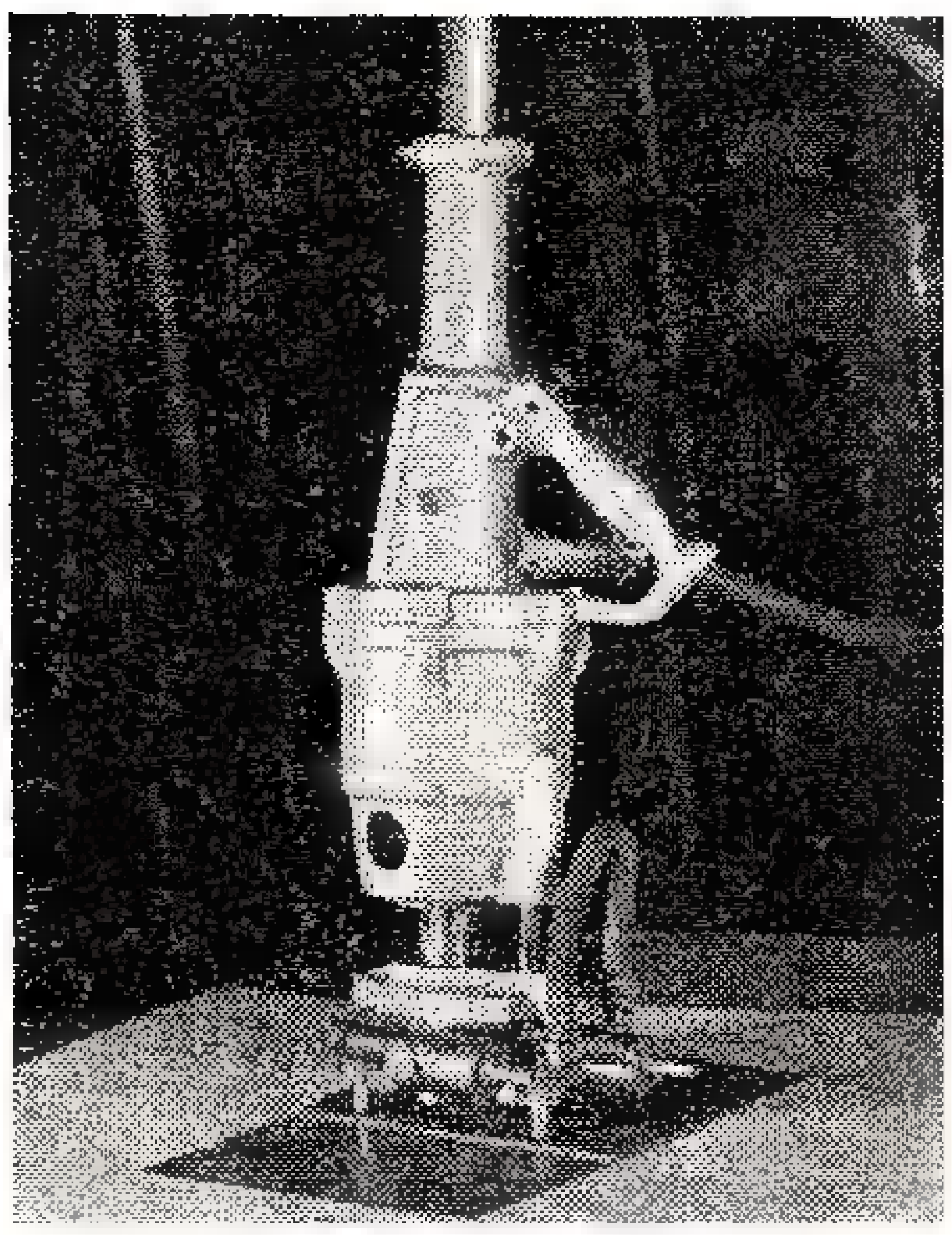
A new clutch for outboard and in-board motors provides forward and reverse gears as well as a neutral position. It is easily installed.

Bank checks are now used as advertising mediums as the result of a new printing method. Pictorial records show the firm's activities without interfering with the check's safety features.

A rug dye which can be applied to any rug with scrub brush or spray gun will not fade in the strongest sun. It can be applied to the rugs right on the floor.

A small arc welder quickly handles small jobs in the home workshop, service shop or metal shop.

Artificial light for greenhouse growers not only supplies all the light needed for growing plants but also provides all the necessary heat.



With both electrodes on one side of the work, this machine makes perfect welds at both electrodes.

Editor's Note—Addresses of manufacturers of these and other new products in this issue can be obtained by sending a stamped, self-addressed envelope to MODERN MECHANIX AND INVENTIONS, *Information Bureau, Fawcett Building, Greenwich, Connecticut. Manufacturers are invited to submit material.*

FACTORY TO YOU

NEW REMINGTON NOISELESS PORTABLE

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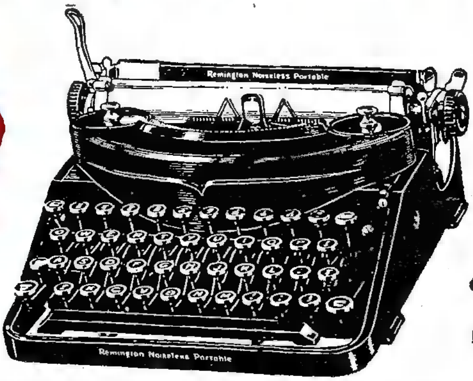

AT LAST! The famous Remington Noiseless Portable that speaks in a whisper is available for only 10¢ a day. Here is your opportunity to get a real Remington Noiseless Portable direct from the factory. Equipped with all attachments that make for complete writing equipment. Standard keyboard. Automatic ribbon reverse. Variable line spacer and all the conveniences of the finest portable ever built. PLUS the NOISELESS feature. Act now while this special opportunity holds good. Send coupon TODAY for details.

MONEY BACK GUARANTEE

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We send you the Remington Noiseless Portable direct from the factory with 10 days' FREE trial. If you are not satisfied, send it back. WE PAY ALL SHIPPING CHARGES.

FREE → TYPING COURSE

Touch
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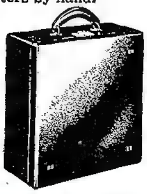
Instructor
Remington
Typewriter

With your New Remington Noiseless Portable we will send you—absolutely FREE—a 19-page course in typing. It teaches the Touch System, used by all expert typists. It is simply written and completely illustrated. Instructions are as simple as A, B, C. Even a child can easily understand this method. A little study and the average person, child or adult, becomes fascinated. Follow this course during the 10-Day Trial Period we give you with your typewriter and you will wonder why you ever took the trouble to write letters by hand.

FREE → CARRYING CASE



Also under this new Purchase Plan we will send you FREE with every Remington Noiseless Portable a special carrying case sturdily built of 3-ply wood. This handsome case is covered with heavy du Pont fabric. The top is removed by one motion, leaving the machine firmly attached to the base. This makes it easy to use your Remington anywhere—on knees, in chairs, on trains. Don't delay... send in the coupon for complete details!

CLIP COUPON NOW...

GREATEST TYPEWRITER BARGAIN IN 10 YEARS

The gem of all portables. Imagine a machine that speaks in a whisper..., that removes all limitations of time or place. You can write in a library, a sick room, a Pullman berth without the slightest fear of disturbing others. And in addition to quiet is a superb performance that literally makes the words seem to flow from the machine. Equipped with all attachments that make for complete writing equipment, the Remington Noiseless Portable produces manifolding and stencil cutting of truly exceptional character. Furnished in black with shining chromium attachments. Mail coupon today!

SPECIFICATIONS. Standard Keyboard. Finished in glistening black with chromium attachments. Takes paper 9.5 inches wide. Writes lines 8.2 inches wide. Standard size, 12 yard ribbon. Makes up to 7 clear, legible carbons. Back spacer. Full size platen. Paper fingers, roller type. Black key cards with white letters. Double shift key and shift lock. Right and left carriage release. Right and left cylinder knobs. Large cushion rubber feet. Single or double space adjustment. All the modern features plus NOISELESS operation.

MONEY-MAKING OPPORTUNITIES OPEN. Hundreds of jobs are waiting for people who can type. A typewriter helps you put your ideas on paper in logical, impressive form...helps you write clear, understandable sales reports, letters, articles, stories. A Remington Portable has started many a young man and woman on the road to success.

HELP WANTED

A GIFT FOR ALL THE FAMILY. If you want a gift for birthday or Graduation . . . one Father, Mother, Sister or Brother will use and appreciate for years to come . . . give a Remington Noiseless Portable. We will send a Remington Noiseless Portable to anyone you name, and you can still pay for it at only 10c a day. Few gifts are so universally pleasing as a New Remington Noiseless Portable. Write today.

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Remington Rand Inc., Dept. 141-5
205 E. 42nd Street, New York, N. Y.

Please tell me how I can get a new Remington Noiseless Portable typewriter, plus FREE Typing Course and Carrying Case, for only 10c a day. Also send me, without obligation, new illustrated catalogue.

Name______________________________

Address______________________________

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OUT OF LUCK!

PUT YOURSELF IN THIS PICTURE
It doesn't pay to gamble on BLOW-OUTS

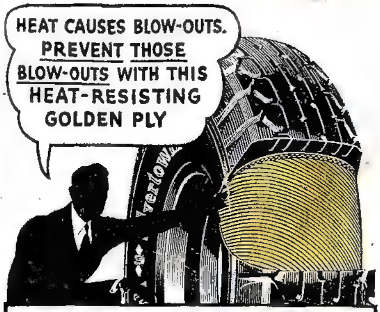
THE ONLY TIRE THAT GIVES YOU GOLDEN PLY BLOW-OUT PROTECTION

Child; pointing: "Look, mamma, the front is all smashed up."
Mother: "Yes, it was a blowout. They're lucky they didn't go through the railing."

* * *

Here's how the amazing Goodrich invention—the Golden Ply—saves lives. At speeds of 40, 50, 60 miles an hour terrific heat is generated *inside* the tire. Rubber and fabric begin to separate. A tiny blister forms. You don't know it—you can't see it—you drive on. Bigger and BIGGER it grows until—sooner or later—BANG! A blow-out! By resisting internal tire heat the Golden Ply—found *only* in Goodrich Silvertowns—keeps rubber and fabric from separating. Blisters don't form inside the tire, and when you prevent the blister you prevent the high-speed blow-out.

When the tires on your car can easily mean the difference between life and death, don't you want this real blow-out protection and the months of extra mileage and greater riding comfort that Silvertowns will give you? And when you stop to think that Silvertowns cost not a penny more than other standard tires, isn't it foolish to gamble on tires? See your Goodrich dealer now.


HEAT CAUSES BLOW-OUTS. PREVENT THOSE BLOW-OUTS WITH THIS HEAT-RESISTING GOLDEN PLY
Silvertown

FREE! Join the Silvertown Safety League. Sign the Safe Driving Pledge and your Goodrich dealer will get for you absolutely free a tail-light emblem with red crystal reflector. No obligation to buy.

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Printed in U. S. A.

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& INVENTIONS MAG NE

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SEE PAGE 73

H. G. Wells Photographs the Future

in His Amazing Motion Picture "Things to Come"

Double Page Spreads

INVENTORS NOTE

★ **You may not be an Edison or a Kettering**
★ **but still you may have a good idea**

TO BE successful as an inventor, you don't need to be an Edison who took out 1099 Patents before he died, or a C. F. Kettering, who helped develop the Self-Starter, Duco, Ethyl Gas, and other outstanding inventions, and is today the famous head of the Research Division of the General Motors Corporation. In fact, you don't need to be known as an inventor at all, if you have a practical, useful, salable invention—or an idea for one—**and go about it right.**

Remember that for every Edison or Kettering, for every McCormick, DeForest or Atwater Kent—there have been thousands of unknown men whose inventions helped along the wheels of progress and helped the inventors financially at the same time.

Many Little Ideas Have Big Commercial Possibilities

For example, who knows the name of the inventor of the wooden golf tee, the ordinary crinkly hair pin, or the metal ball or disc that the average housewife uses for scouring pots and pans? Who knows the inventors of the thousands of gadgets that you will find in the ten-cent stores, in the modern drug and department stores? Some day, stop and look at some of the simple articles you'll find on the counters of a ten-cent store. Notice how many of them are marked Patented or Patent Applied For. It is an interesting, educational experiment. These inventors, most of them, weren't of the genius class. They simply got an idea for doing something in a better, easier, faster, or more economical way—AND THEN DID SOMETHING ABOUT IT.

Interesting Points

Who is today's "champion inventor"?

Ans.: John F. O'Connor, of Chicago, Ill., holds 949 Patents, more than any other living man.

Who is "Lady Edison"?

Ans.: Miss Beulah Louise Henry of New York City leads all women inventors, holds fifty patents; is known as "Lady Edison".

What is an improvement?

Ans.: Nearly all inventions today are improvements over earlier inventions. Often the improvement proves more profitable than the earlier invention.

Is a model necessary?

Ans.: Today, most inventions are patented without models. A subject fully explained in our book.

What is the preliminary search?

Ans.: The preliminary search is ordinarily the first step to help an inventor. Also fully explained in our book. Send for a copy today.

You may be able to do as well as others **who have been successful. That only time can tell.** But there is one thing you can do, **and do now,** without waiting on time. You can find out easily and quickly **exactly what to do to protect yourself.** In the 48-page book, "Patent Protection" shown **on the** opposite page, which will be sent to you FREE, we tell you what many other inventors have done, just what you yourself must do to make Application for a Patent, give you interesting facts about inventive history, show you 115 mechanical movements that inventors have used in working out ideas, and **much more.** Decide now to get a copy of this interesting book. Its facts can be worth much—yet they cost you **nothing.**

A New [redacted] About Selling Inventions

There are two sides to every inventive success: The inventive side and the commercial side. A good invention poorly handled, can prove a failure commercially. An ordinary invention, properly handled, can be made a money maker. In the special booklet, shown here, we give you some suggestions on "When and How to Sell an Invention"; practical hints on the commercial side of inventing. We'll send this new booklet along with the big 48-page book, "Patent Protection" illustrated on the next page. Use the convenient coupon to request your copies.

Suggestions on
WHEN and HOW
to Sell an INVENTION

We Cordially Invite You to . . .

YOUR QUESTIONS ANSWERED! There are a lot of questions that the average man with an invention, or an idea for one, wants answered before he goes ahead. Here are a few of them that most inventors put up to us: How do the Patent Laws protect me? What easy steps can I take, without cost, to put myself in position to support my belief that I am the first man to think of my invention? Is a Patent worth the cost? Should I try to sell my invention before I have it Patented? Is there any safe, business-like way to secure financial help? If I do apply for a Patent how shall I reach people who can market my invention? Can I protect and sell an improvement on some invention that has already been Patented? These are but a few of the questions which usually confront the average man. **You need the answers! YOU CAN HAVE THEM,** without cost, trouble, or delay.

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For more than thirty-seven years, this firm has been helping men with an inventive turn of mind. We maintain a large staff of trained, experienced specialists—**Registered Patent Attorneys, Draftsmen, and Searchers to help our clients secure all the protection to which they are entitled.** Fees are reasonable. Deferred payments frequently arranged. Questions promptly answered. Write us frankly with absolute assurance that what you say will be treated with strictest secrecy. **But first send for the FREE BOOKS shown on these two pages.** They are filled with facts, pictures and suggestions. They tell you things about Patents, Inventions and Selling Inventions that we have learned in our long experience. **They may save you time, expense, EVEN LATER DISAPPOINTMENT.** Simply fill in the coupon or write us a confidential letter. No charge, no obligation. **Mail the coupon today.**

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Send me FREE copies of your books "Patent Protection" and "When and How to Sell an Invention." (Note: Same books supplied by any of branch offices listed above.)

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FOR INVENTORS And Mechanical Minded Men

How TO OBTAIN A PATENT

Answers to Questions on Page 131

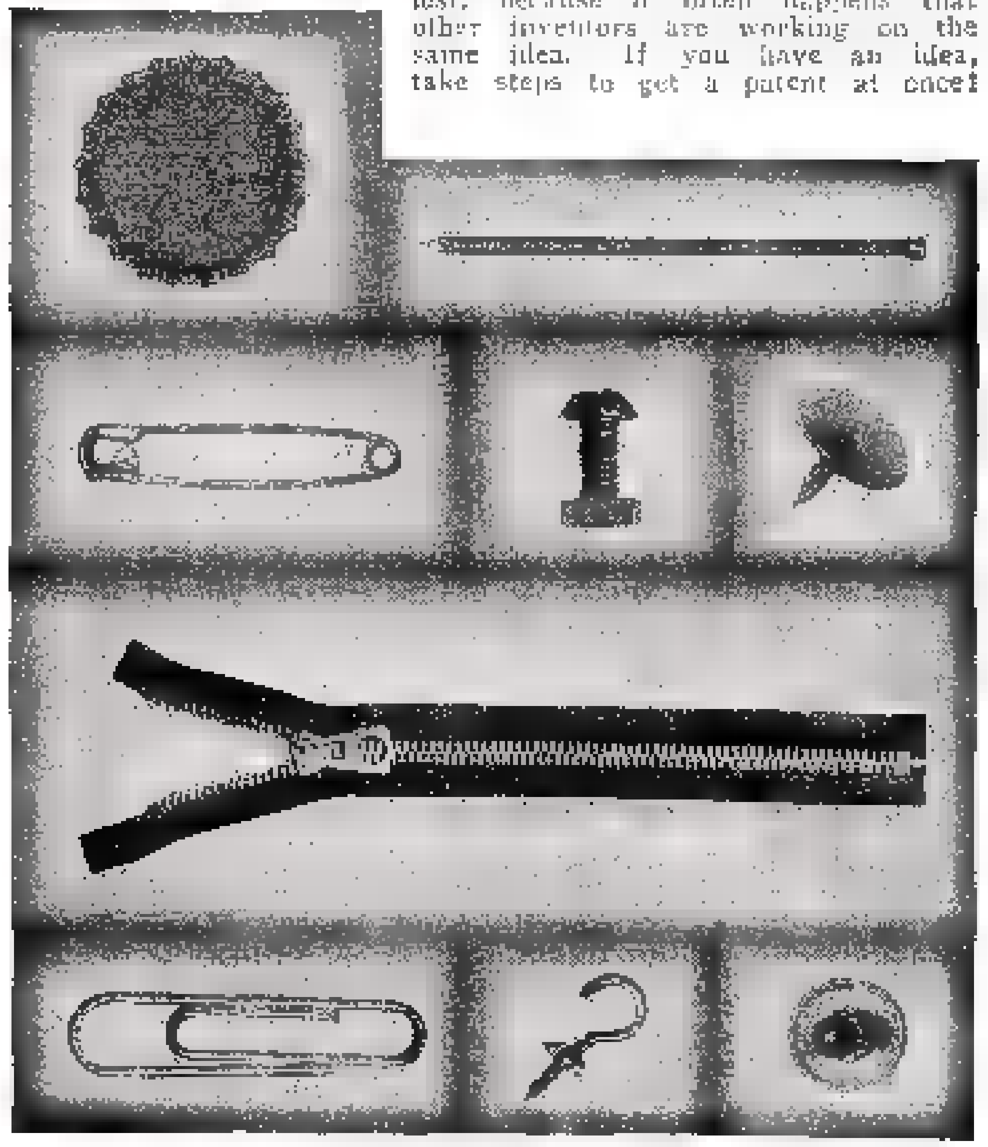
1. By patenting the invention.
2. Send sketch or model and description with search fee to a registered patent attorney.
3. 1101 U. S.—1279 Foreign.
4. Abraham Lincoln.
5. 17 years.
6. It confers [illegible] patentee the exclusive right to make, sell and use the invention covered by the patent.
7. No. Pencil sketch and description will usually suffice.
8. A form on which an inventor may execute his sketch and description. When properly filled out it is documentary evidence of your conception of the invention.
9. Because a layman or a lawyer in general practice is not learned in patent office practice.
10. As soon as patent application covering the invention is filed in United States Patent Office and official receipt received.

CLARENCE A. O'BRIEN
and Hyman Berman
317-F Adams Building
Washington, D. C.
Registered Patent Attorneys Before U. S. Patent Office

(Copyright Clarence A. O'Brien)

Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a United States Government Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, take steps to get a patent at once!



THE FREE BOOK shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing—securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

KNOW HOW to START
KNOW EACH STEP to TAKE

Before Going Too Far With Your Ideas

Very often, the patent procedure is what we call a "simple" one—as illustrated here. Our FREE BOOK "Patent Guide for the Inventor" describes what to do and how to go about it. Send for it by all means—let us urge, however, that you take the first step (STEP No. 1 to right) without further delay. It will prevent wasted work, mis-steps, and going ahead "in the dark"—your whole patent procedure depends upon the first step.

Immediate Search Necessary

A Search at the U. S. Patent Office will disclose one of three things: That you have hit upon an entirely original idea—that you have suggested patentable improvements upon an existing invention—or that your invention has been anticipated throughout, and you should drop it. You should have this information at once. The next steps (the whole procedure of obtaining a patent) will be thoroughly explained to you in our FREE BOOK.

Our FREE BOOK tells everything you need to know about patents. We will mail this book upon receipt of your letter requesting search—or if you want to read it before having search made, simply fill out the coupon below.

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This FREE Record of Invention Form enables you to make in convenient form a sketch of your idea and have it witnessed in a manner of value to you should the occasion for evidence arise. MAIL THIS COUPON TODAY and obtain our FREE BOOK and Record of Invention Form.

PATENT GUIDE FOR THE INVENTOR
CLARENCE A. O'BRIEN
WASHINGTON, D.C.

STEP No. 1

Make a rough pencil sketch of your invention, describe it fully, and send it to us for preliminary search through U. S. Patent Office.

STEP No. 2

Our trained searchers will then make a preliminary search of the pertinent U. S. Patents to determine if your invention is probably patentable.

STEP No. 3

Our complete report of search and opinion on patentability will be mailed to you with copies of U. S. Patents that we consider nearest to your invention.

STEP No. 4

If you decide to make patent application, for customary fees explained in our booklet, our draftsmen will make drawings and proper papers will be prepared for presentation of your invention to the Patent Examiner.

CLARENCE A. O'BRIEN
& Hyman Berman
317-F Adams Building
WASHINGTON, D.C.
REGISTERED PATENT ATTORNEYS
BEFORE U.S. PATENT OFFICE

Please send me your FREE BOOK, "Patent Guide for the Inventor," and your "Record of Invention" Form, without any cost or obligation on my part.

NAME ....

ADDRESS ....

....

(Important: Write or print name plainly)

Random Chips from the Editor's Workbench

BOATS, boats, boats and more boats. The spring rains are certainly turning MM's workshop fans into boat builders and it looks like this summer will find hundreds of our readers out on the lakes and rivers in their own craft. Our recent edition of *How To Build 20 Boats* is going fast. Now is the time to get your copy (it's 50 cents) and get started on a practical boat for summer cruising, sailing or fishing. Or if you wish, you can get a copy of MM's free Blueprint Catalog, which contains descriptions of a whole assortment of boats, from 7-foot *Tar Baby* to the 30-foot ocean cruiser *Tahiti*, more than 40 boats in all.

***

We were down to see the eighth annual exhibition of the New York Society of Model Engineers recently and one of the first things we saw was a model of our *Tiny Tom*, the OO gauge pencil-length locomotive which appeared in our November, December and January issues as well as in our 1936 *How-To-Build-It Book*. We lost no time in getting in touch with its maker, William Pinter of Garwood, N. J. We asked him why he happened to build *Tiny Tom* and he answered with this letter and photograph to win our first prize of $5:

Garwood, N. J.

Dear Editor:

Here is the story of how I happened to build your *Tiny Tom*. I read several model-making magazines, but I never thought of *Modern Mechanix* until, in November, 1935, a fellow model maker presented me with a copy of your publication. I liked the way you detailed your drawings of models, which, by the way, I do not find in other magazines. As these drawings make it very simple and easy for anyone without experience to construct any of your models, and as I was especially taken with the model of *Tiny Tom*, I decided to build this small locomotive in my spare time.

I did not use any castings in the model, all parts being made by me by hand, turned off a lathe. The drive wheels were built up of brass and, in fact, brass and sheet zinc was used throughout the whole model. Zinc is very nice to work with in model work, it being easy to form and it makes a very neat soldering job. For power I used a miniature 6-volt motor which I purchased several years ago.

I have been building models for some years in O gauge but this being much too large for an indoor layout, I decided to switch to OO gauge.

I would appreciate it very much if you would publish more rolling stock and track layouts in your valuable magazine, preferably to scale. I am sure that not only myself but many of your readers would be glad to see this information in your periodical.

William Pinter.

Here is "Tiny Tom", MM's pencil length locomotive, in all his glory at the New York Model Engineers exhibit recently. "Tiny Tom" and his maker, William Pinter, steam off with first prize of $5 this month. Note detail of this perfect model.

It is letters like that that gladden the heart of any editor. As for the plans for rolling stock and track layouts that Mr. Pinter asks about, we knew those requests would come pouring in and so in our April issue we put in plans for everything, from flat car to caboose.

***

Our second prize letter and photograph was sent in by Gene Caswell of Miami, Fla., who did some fast work on building the record breaking model plane which appeared in our March issue. You all know, of course, that each month we award three prizes for the best letters and photographs sent in to the Editor's Workbench. First prize is $5, second prize is $3, and third prize is $2. Speaking of prizes, don't overlook our big $1,000 cash contest which tests your knowledge of cars. Details appear on page 48. Gene's letter follows:

Miami, Fla.

Dear Editor:

I have enclosed a snapshot of the model plane I built from the plans that appeared in the March issue of MM. The ship performed fine on its trial flights. I tried to obtain an action picture of the plane but it was too fast for me.

"Too fast for the camera" was this record breaking model plane, and so her builder, Gene Caswell, photographed her standing still to win second prize. He built her from plans appearing in the March MM and finds her the real thing.

I enjoy every page of your magazine including the ads, and, of course, especially anything about aviation and model building as I am a model fan.

Gene Caswell.

***

Because of the good job George V. Piver of Beaufort, N. C., did in building *Nomad*, one of the boats whose plans are published in our recent edition of *How To Build 20 Boats*, we are awarding him the third prize this month. You can see why when you read his letter, which follows:

Beaufort, N. C.

Dear Editor:

I am sending you some snapshots of my *Nomad* which I built last fall. She was designed for inland waters but has proven seaworthy. I have used her for trolling for blue fish at Beaufort Inlet and she is more seaworthy than some of the larger boats here.

So far I have raced seven boats and beaten them all, and I haven't much sail, as you can see by the photo. I have had 1,290 pounds in her and had plenty of room to spare.

I am building a camp trailer now and will send a photo soon. I never miss a copy of your magazine. Let us have some more boat plans.

George V. Piver.

"She is more seaworthy than some larger boats here," writes George Piver in describing his *Nomad*. His boat won 3rd prize of $2.

As long as we are on the subject of boats, we might mention that the boating bureau of the Outboard Motors Corporation of Milwaukee, Wis., has compiled a list of 188 outboard boat builders in all parts of the country. Just drop them a line and you will get the list free.

***

Dr. Paul W. Bemis of Everett, Mass., states in a letter: "I have a very beautiful workshop with about $5,000 invested and work in metal and wood. I enjoy your publication and have been a reader from almost its inception." What is your shop worth?

***

C. E. Dawe of Spokane, Wash., describes his shop as follows: "I have a wood working shop, lathe, jig saw, jointer, and circular saw, and use it as a hobby, as I like nothing better than to be sawing or working with wood. I buy MM each month from the newsstand and get lots of ideas and enjoyment out of it."

***

Bert Tucker, 184 Coogee Bay Road, Coogee, Sydney, Australia, would like to exchange ideas and news with MM readers anywhere. Here's a good opportunity for stamp collectors.

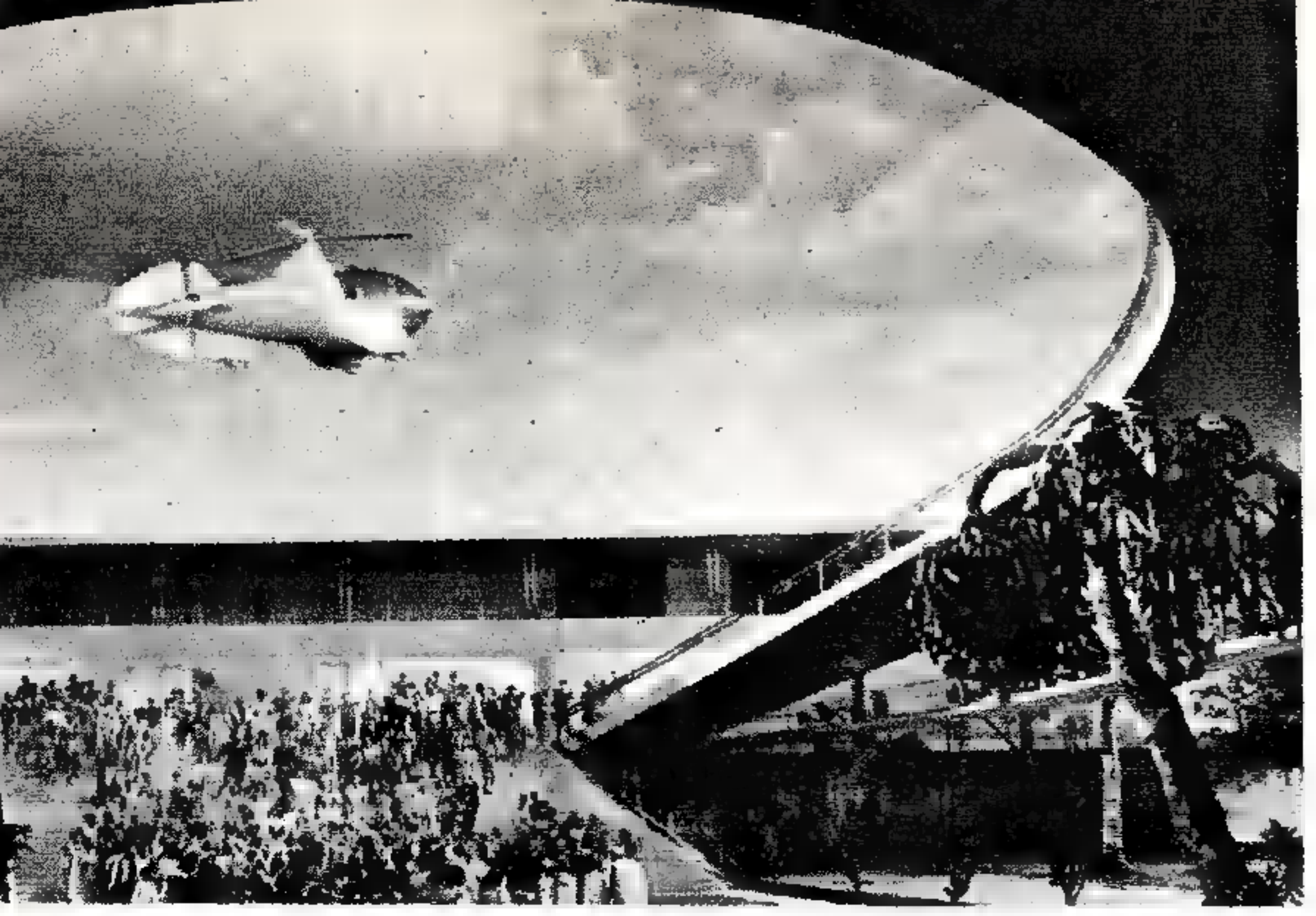
***

Richard Verreault of Buffalo tells us that in addition to Charles Wittholz the boat, pictured in *How to Build 20 Boats* in connection with Sam Rabl's article on *Sunray*, was built by Paul J. Fries and himself under the supervision of George T. Verreault. The use of Mr. Verreault's shop was one of the main factors in the successful completion of the boat.

***

"In the June, 1935, MM I built your shortwave two-tube receiver," writes Romeo Bartalo of East Boston, Mass. "I logged ten South American

[*Continued on page 22*]



Airplanes which rise and descend vertically are seen in "Things To Come." Here again Wells limits himself to improving things already proven practical, combining helicopters, auto-gyros and dirigibles in a single unit.

genius of our day. With other miracles of the year 2054, they will soon be seen in Mr. Wells' startling motion picture, prophetically entitled "Things to Come."

Not the least convincing fact about Mr. Wells' vision of the future is the clean-cut way in which he eliminates what he calls scientific "balderdash." Tomorrow's world will be a triumph of science and the machine, to be sure. But there will be no robot men; machines will not rise like Frankensteins to slay their creators.

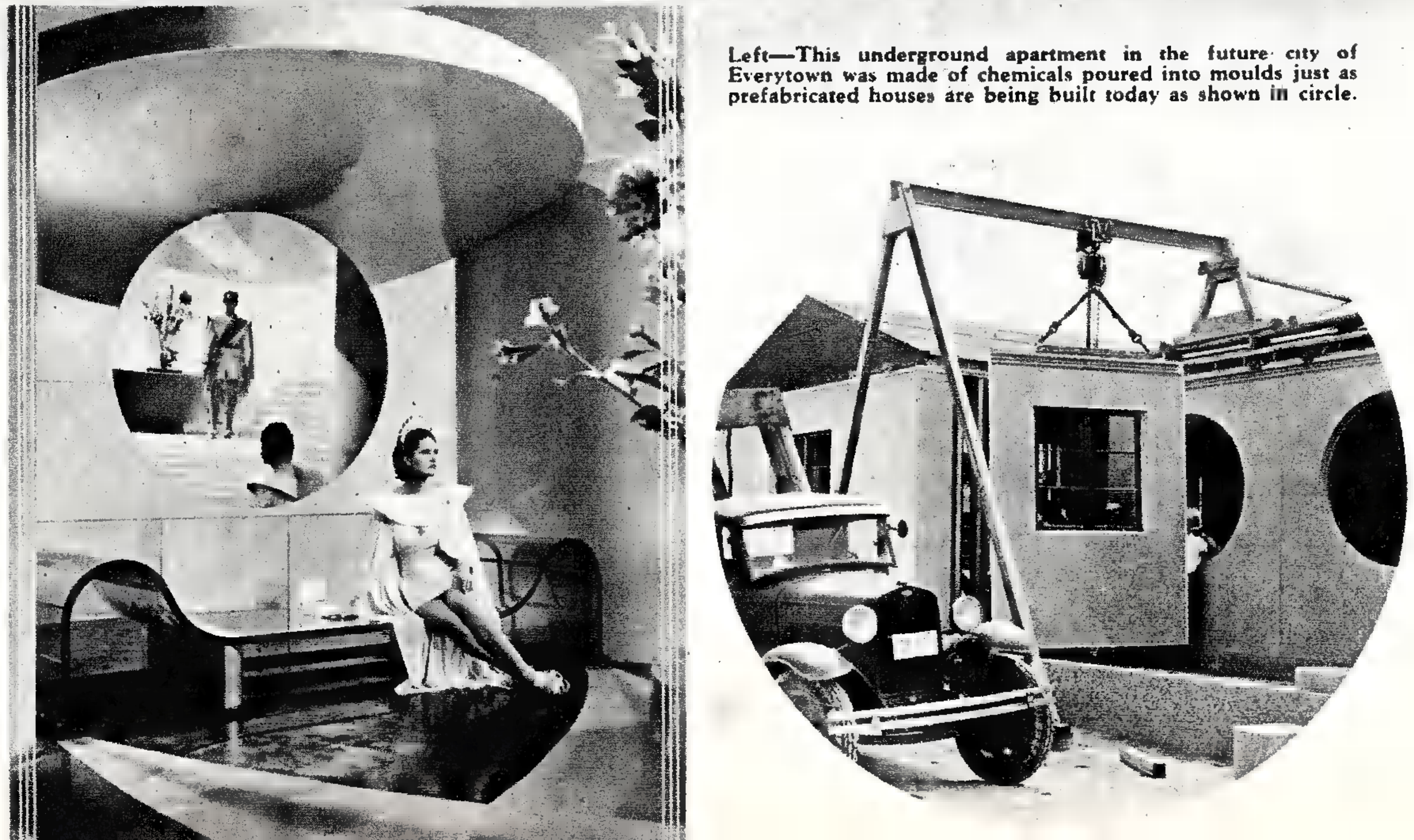
Such fantastic touches as these often adorn the prophecies of less able scientists than H. G. Wells. But in "Things to Come" we have painted for us an astonishing picture in which there is not a single development which does not follow naturally out of laboratory discoveries of our own day. It is inspiring for us folk of 1936 to realize that the progress of science, as presented each month in the pages of MODERN MECHANIX & INVENTIONS, is laying the foundation for a new civilization.

"Things to Come" begins in 1940, only four years away. Without warning, bombing planes appear suddenly over the city of Everytown, symbolic of every other city in the world. It is Christmas Eve. Out of the black night comes the soul-shattering terror of the bombs, rending skyscrapers to kindling, blowing people to atoms. Deadly new gases sweep through the ruined city, choking out the lives of men and women and children, proving that there will be no non-combatants in the next war.

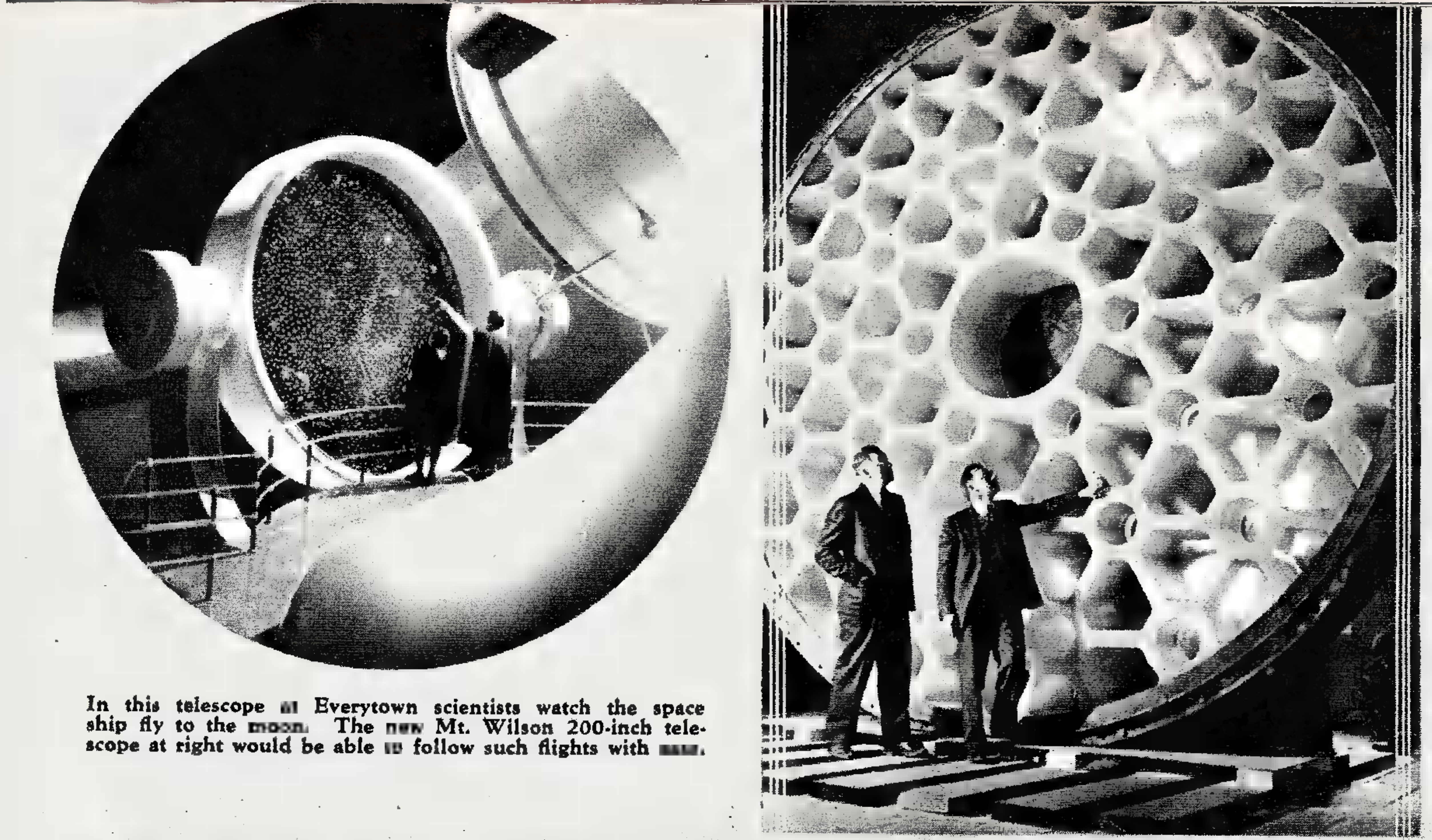
Frightful as the dramatized bombing appears, it is no exaggeration. Since the last aerial bombing on a large scale in 1918, an amazing increase in efficiency has been demonstrated by the fighting planes of the world. The destruction wrought by Zeppelins and bombers during the World War was trivial when contrasted with the tremendous destructive power of modern air forces.

Despite almost complete destruction, Everytown hurls every fiber of its strength against the enemy. Soon there comes a new horror—the shells of the enemy spread the germs of a strange disease, the Wandering Sickness. People stricken by it wander blindly for hours until they die. Water and food supplies are contaminated. Doctors can devise no cure for it, for all laboratories, all means of research have been destroyed.

Mastery of Machines Is Key to Man's Survival



Left—This underground apartment in the future city of Everytown was made of chemicals poured into moulds just as prefabricated houses are being built today as shown in circle.



In this telescope at Everytown scientists watch the space ship fly to the moon. The new Mt. Wilson 200-inch telescope at right would be able to follow such flights with ease.

Today's Progress Paves Way to Future Wonders

This weird disease could be similar in form to the invisible plant disease virus which Dr. W. M. Stanley of the Rockefeller Institute for Medical Research succeeded in crystallizing recently. A few crystals of this substance dissolved in the city water supply would leave scarcely a resident alive.

By 1970 the endless warfare has reduced the world to a state of barbarism.

Nations have ceased to exist. In their place are communities like Everytown, dominated by local war-lords fighting with their neighbors. The people of Everytown live under the thumb of The Boss.

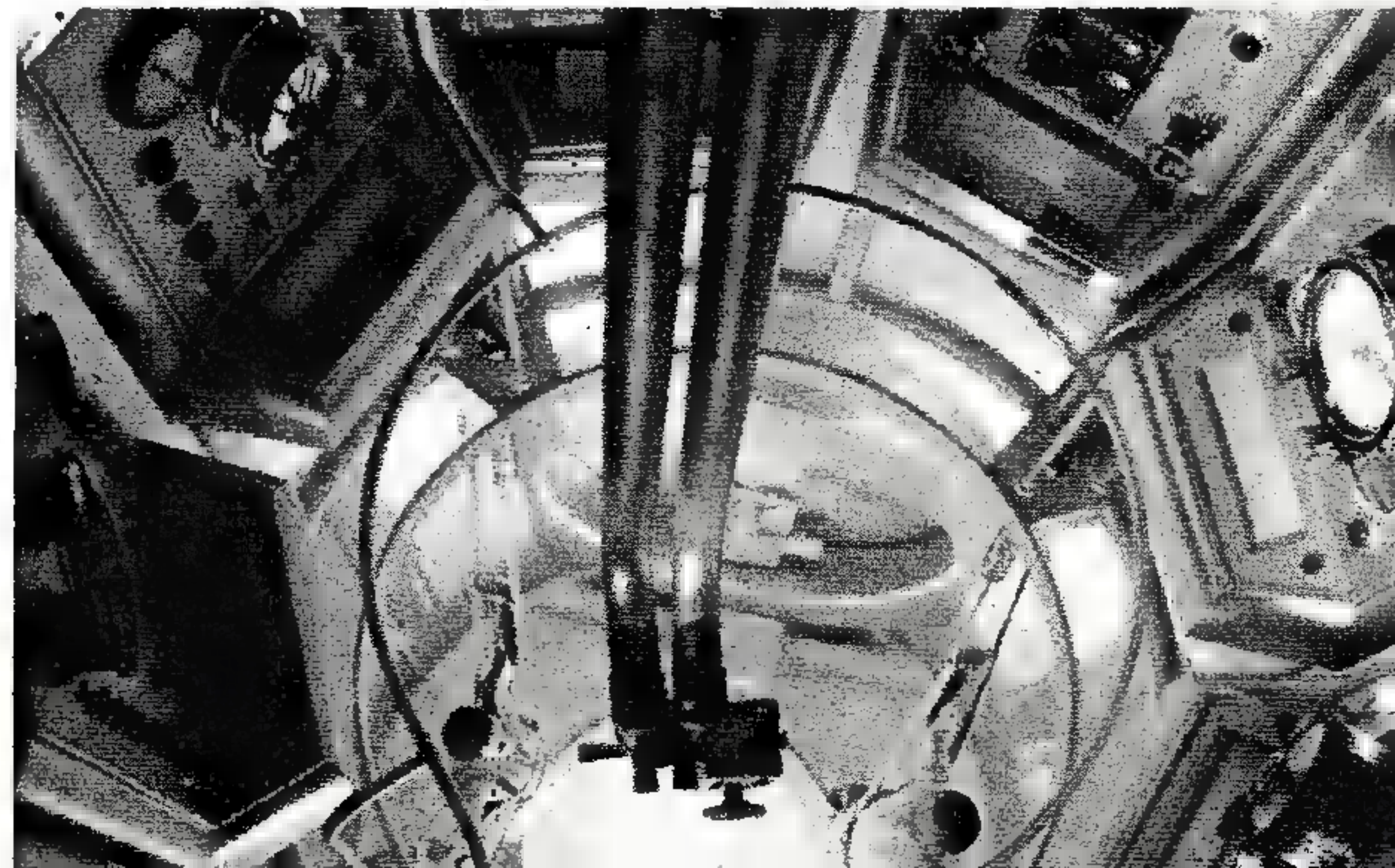
In this desolate scene of havoc a miracle occurs one day. A strange airplane with queer, swallow-like wings descends in Everytown. The pilot is John Cabal, an aviator who lived in Everytown before the war.

The Boss eagerly demands to know if he can buy planes and gasoline to fight to a "victorious peace," but Cabal shakes his head. His government helps no one to wage war. The Boss angrily orders him thrown into a cell, where, some hours later, Richard Gordon finds him. Gordon is an old friend of Cabal's, and with the latter's directions Gordon gets gasoline from Cabal's plane, patches an old ship and manages to escape to Basra.

The throb of powerful motors heralds Gordon's return with a squadron of bombing planes. The Boss is terrified, but he has a hostage! He ties Cabal in the middle of the square where the invaders must see him. In spite of this, the bombs begin to fall. They thud to earth and burst with harmless "plops," but nothing seems to happen. Then, slowly, the Boss and his soldiers and all the citizens of Everytown fall asleep. For the bombs of the airmen are not designed to kill. They release the gas of Peace, a powerful anesthetic.

Thus, in 1970, the soldiers of science begin to build the world anew. And what a world!

We see it next in 2054. An age of enormous mechanical and industrial energy has followed world peace. Flying over the new



An interior view of the space ship, looking down upon the two passengers who are to journey to the moon. Note the manner in which they are suspended to absorb the first shock.

FEEDING *America's* Appetite *for* GAMES

America has [redacted] insatiable appetite for games, but it is subject to whims. Feeding this appetite is [redacted] game itself, and one never knows which way to jump.

by
W. A. SWANBERG

Above—Oswald B. Lord, standing, supervises the play of his new game, Politics. Thousands of people [redacted] spending their evenings with this game, in [redacted] attempt to become President.

AMERICA likes to play. Whether they know it or not, millions of otherwise rational Americans are forever waiting to be caught in the craze for a new puzzle, a new diversion, a new game. The very word "game" sounds trivial, but it isn't. Games have [redacted] powerful influence on the social life of the world, and—games are the delight and the despair of the men who invent them.

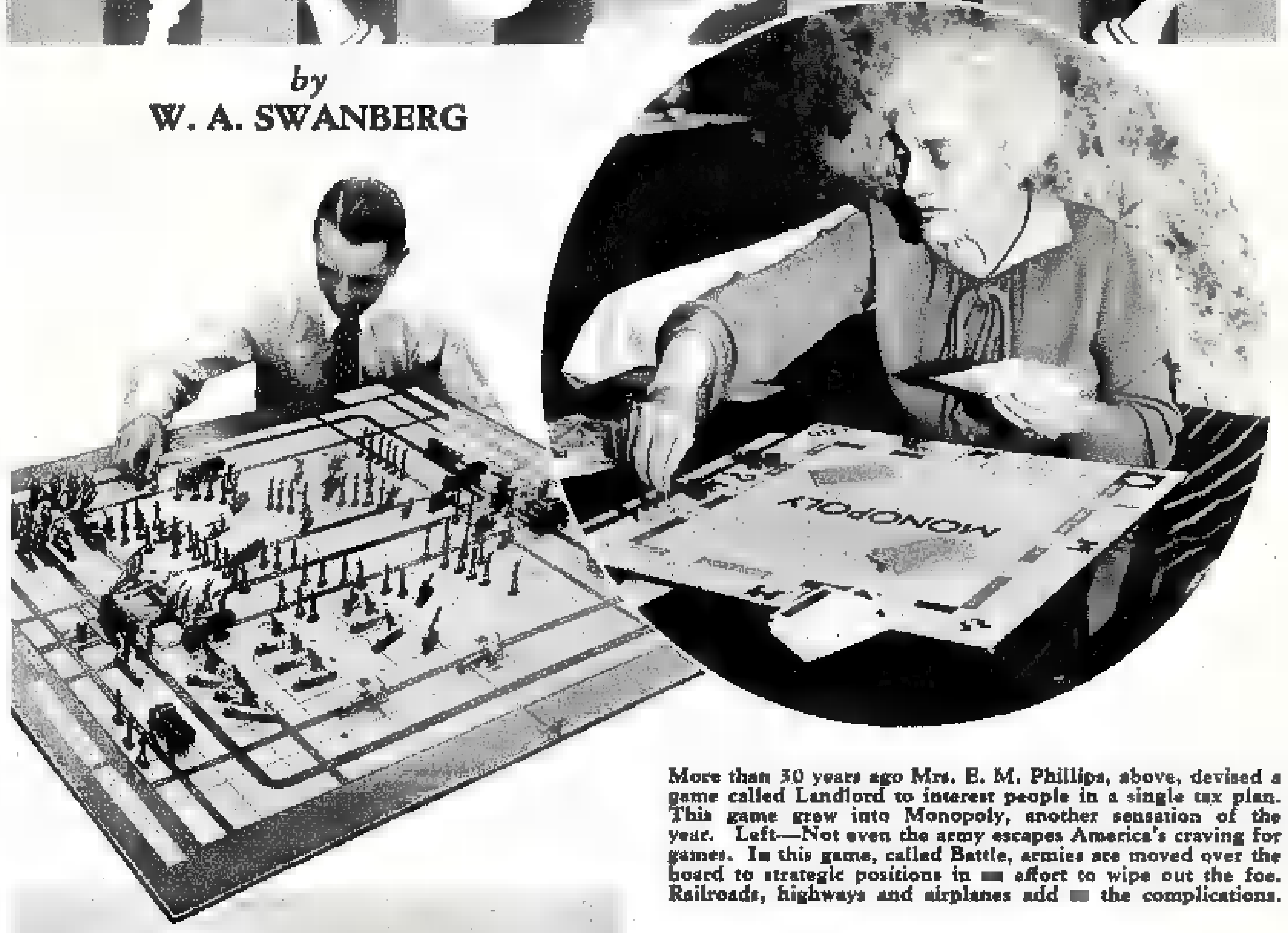
America likes to play, and is willing to pay for its fun. Right now it is playing [redacted] new game called Monopoly. Already the fastest-selling non-card pastime in the country, Monopoly bids fair to break all-time popularity records.

Out of the East came Mah Jongg [redacted] captivate the public for a season. It proved [redacted] technical, however, and was lost.

Like parcheesi, Monopoly is played by shaking dice and moving tokens around a spaced board. But there the similarity ends. The Monopoly player is furnished at the outset with a handful of script money. When his dice land him in an unoccupied "street" he may purchase holdings there, and may levy rent from any other player unfortunate enough to fall in his domain. If he is clever he may acquire hotels, utilities and railroads. The ultimate object, of course, is to maneuver assets so cunningly that all other players are left bankrupt, with the winner holding all. The spendthrift player who manages his finances poorly finds himself utterly ruined.

Monopoly, though it has taken hold only during the past year, has more than three decades of history behind it. In 1904 [redacted] young woman of Virginia named Mrs. Elizabeth Magie Phillips devised a game which she called "Landlord." Her motive was not to make money, nor primarily to furnish amusement.

"I conceived the game of Landlord to interest people in the single-tax plan of the great economist, Henry George," said Mrs. Phillips recently.



More than 30 years ago Mrs. E. M. Phillips, above, devised a game called Landlord to interest people in a single tax plan. This game grew into Monopoly, another sensation of the year. Left—Not even the army escapes America's craving for games. In this game, called Battle, armies are moved over the board to strategic positions in [redacted] effort to wipe out the foe. Railroads, highways and airplanes add [redacted] the complications.

Following close upon the heels of [redacted] Jongg as [redacted] parlor pastime [redacted] Backgammon. This game is n[redacted] new, having been played in England for centuries. [redacted] is still popular.

The game continued to be played in [redacted] small way, and in 1924 Mrs. Phillips patented [redacted] variation on it which she called "The Landlord's Game." This version later fell into the hands of Charles B. Darrow, of Philadelphia. Darrow revised the game and patented it. In 1931 he sold a few sets to friends, and finally interested a large Philadelphia department store in the idea.

Parker Brothers, of Salem, Massachusetts, foremost manufacturers of games in the country, at first rejected Monopoly because in their opinion it required too many parts and took too long to play—three hours or more. By spring, however, the game attained such popularity that the Salem firm bought it under the patents of both Mrs. Phillips and Mr. Darrow.

While Monopoly was beginning its amazing rise, Oswald B. Lord, a young textile executive in New York City, set his agile mind to devising a game with [redacted] new twist.

"Games have always been something of [redacted] hobby with me," he said. "But it struck me that most new games were not really new at all, but were merely variations on old favorites like parcheesi, chess and checkers."

Oddly enough, it was while taking a hot shower that Mr. Lord pounced on a subject that offered excellent possibilities for a game. Politics! What with a presidential campaign

[*Continued on page* 134]

He Made Sky Mapping a Big Business

THE STORY OF SHERMAN M. FAIRCHILD AND HIS AERIAL CAMERA

The aerial rapid action camera, modern flying [redacted] of the well-known press camera. Note how easily a finger can trip or wind the shutter, advance fresh film and aim it for more exposures. Thus the camera becomes an integral part of the photographer, who operates it with the same ease as he does his automobile.

High above the broken floor of the Rio Grande River basin, an airplane growls monotonously over 32,000 square miles, each click of its Cyclopean [redacted] bringing nearer to completion the largest photographic mapping project ever undertaken in the United States.

by
RICHARD H. PARKE

EXACTING and tedious is the scientific job of gathering up 32,000 square miles and literally pasting them in your hat. Only one man is utterly capable and he is the fellow who supervises the shooting and assembling of this vast mosaic.

He is the 39-year-old president of the Fairchild Aviation Company—Sherman M. Fairchild. The planes are his, the cameras are his and the science of aerial mapping grew from the two decades of study he put into air photography.

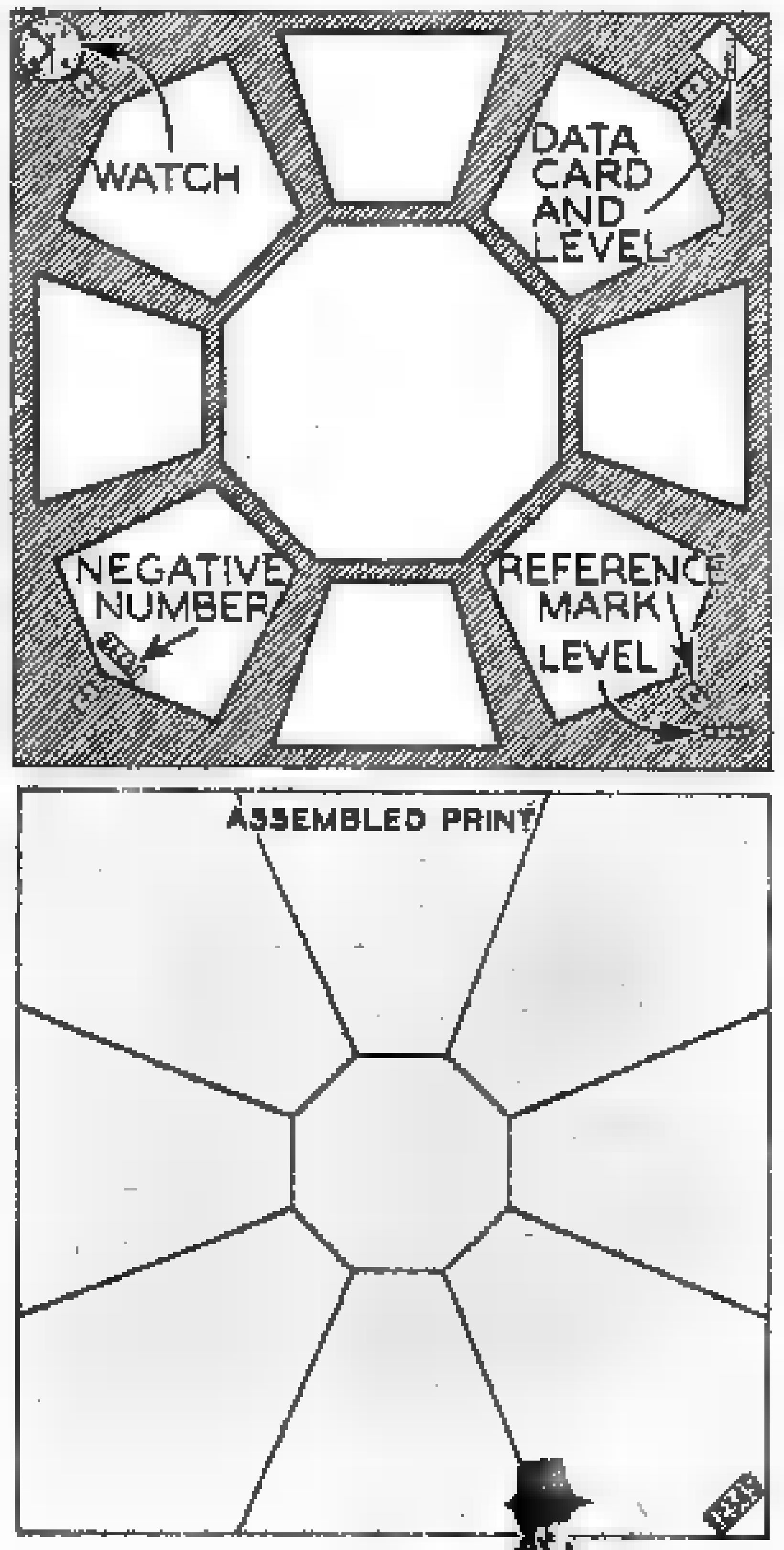
It isn't easy even now, this business of sweeping up miles and not losing a single detour. And it wasn't easy back in 1918, when Fairchild tried to interest U. S. Army officials in his new and revolutionary type of aerial camera, for he met with polite indifference and downright skepticism. But today he is world famous as the man who made sky mapping a big business. His latest invention, a $26,000 ten-lens camera, will photograph in one operation a ground area twice the size of New York City.

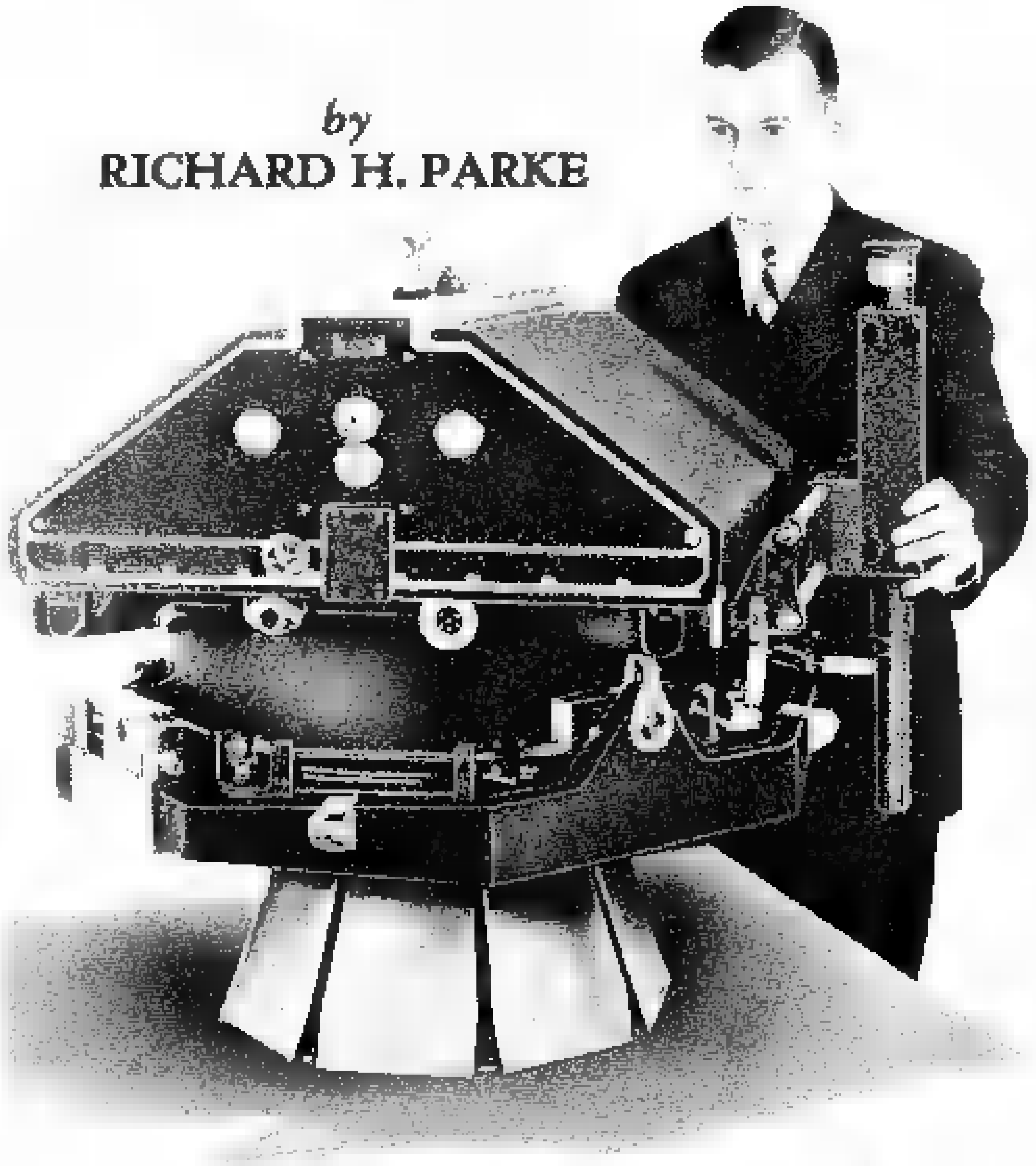
Fairchild's interest in photography began while he was still in college. After the army had rejected his new type of aerial camera, he went to work in the engineering department of the Eastman Kodak Company. Then, again in 1922, he tackled army officials once more, this time persuading them to purchase twenty of his new cameras for $1,800 apiece.

Two years later found him organizing an aerial magazine and newspaper photographing service, with two planes from Huff-Daland & Company and representing them exclusively in the field of photography planes. But no clients appeared. Just when he was ready to give up an order came from the Brazilian Government for two machines.

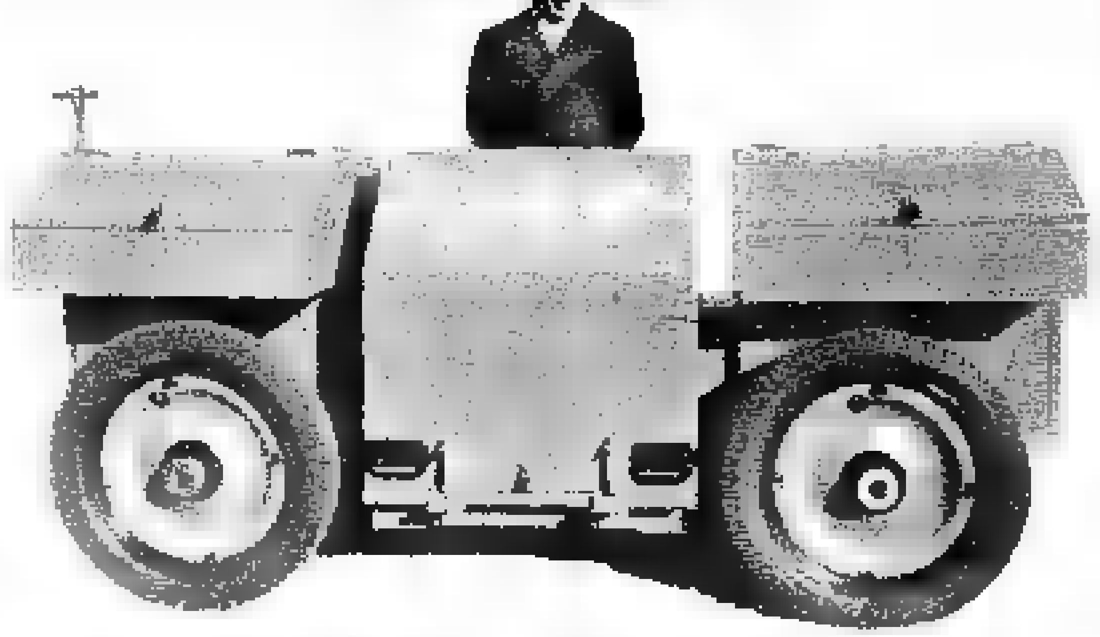
Jubilant, he informed his sponsors, only to learn with dismay that his agency contract had expired three days previously. This news was a bitter pill to swallow but young Fairchild got out of that predicament by cabling Brazil that his present planes were "unsatisfactory" and that newer and better ships had just been developed. Brazilian officials took him at his word and ordered two.

At that time one of the greatest airplane designers, Igor Sikorsky, was at Roosevelt Field—loafing. Fairchild hired him on the spot. Sikorsky jumped at the chance—his first job in America since he came over from Russia as a refugee. And the contract with Brazil was fulfilled successfully. A Fairchild cabin monoplane is now a common sight, and this company ranks among the leaders in American private plane production. The corporation has four subsidiaries, manufactures 75 per cent of the world's aerial cameras and owns the largest aerial picture library in existence—in fact, the entire world.





Sherman M. Fairchild and his nine-lens single unit aerial camera. The diagram (upper left) is that of the negative, under which is the print. The watch, negative number, reference marks, level and data card are photographed simultaneously with the remarkable nine-view picture.



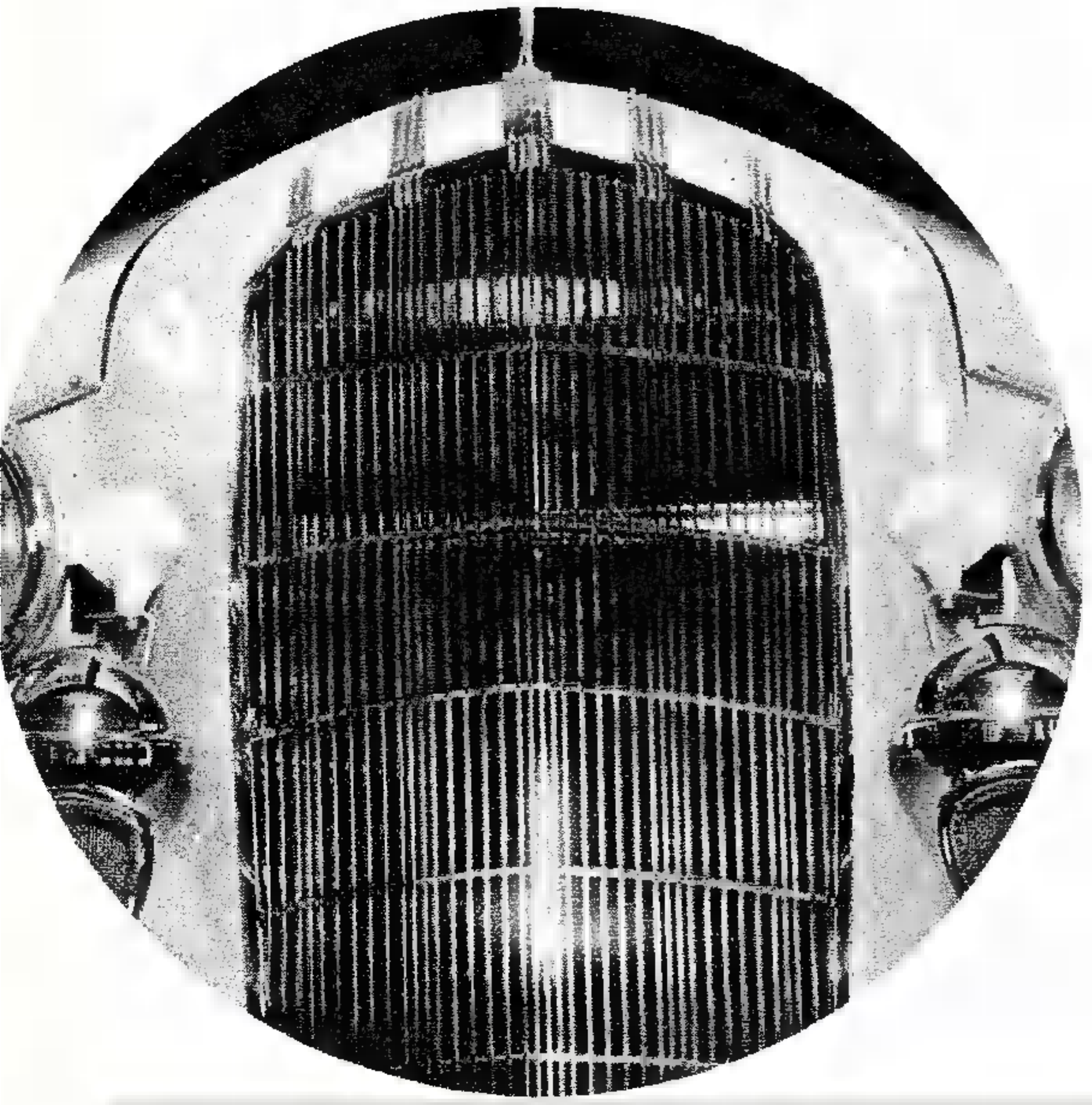
A specially built dolly cradles the nine-lens camera designed for the U. S. Coast and Geodetic Survey. Front and [redacted] compartments safeguard accessories.

Already referred to is Fairchild's latest survey—the Rio Grande project. This is the third consecutive job his organization has undertaken for Uncle Sam. The first two were the aerial mapping of Boulder Dam and 25,000 square miles of watershed in the Indian Reservations of Arizona, New Mexico and Utah.

All these jobs, which take in more than 84,000 square miles of terriotory, are part of the government's program for soil conservation. From the completed maps, experts will be able to plan the control of this vital problem and, in the case of Boulder Dam, will be able to determine in advance the number of auxiliary dams needed to control the silt now being washed into the reservoir from the various tributaries.

Preparing an aerial map involves a tremendous amount of detailed work, work

Do YOU Know CARS? $1000.00 CONTEST!



The Name of This Car Is

....

EVERY day you witness or participate in the parade of 1936 automobiles. You see new cars on every hand, but do you recognize the cars you meet? If you do, you have a good chance to win one of the 183 cash prizes in this big $1,000.00 contest.

In this installment, the second of a series of three, there are printed the identifying features of four popular automobiles. All you have to do is write in the alloted space the name of the car from which the identifying feature was taken.

Less than 30 years ago it was possible to recognize your neighbors team of horses a half mile away simply by their gait. Whether or not this ability to identify familiar objects has been passed on to the auto-driving generation is the question that brought about this unique contest.

After identifying the cars, the next step is to write a ten-word safety slogan, something straight to the point which may be instrumental in saving hundreds of lives.

This slogan can be on any phase of motoring safety which will awaken the driver or pedestrian to his or her responsibility.

The first installment of the contest appeared in the April issue, and the third will appear next month. Study the rules carefully, and write your safety slogan while waiting for the last four photos next month.

THE RULES

1 Cut out each photograph and in the space below it write the name of the car from which the identifying feature was taken.

2 DO NOT MAIL YOUR ENTRY UNTIL ALL TWELVE PHOTOGRAPHS HAVE BEEN PUBLISHED.

3 Answer accompanying questions. Your replies to these questions will not be considered by the judges, but to be eligible each entrant MUST answer the questions.

4 In ten words or less state your "SAFETY SLOGAN." The originality shown in the "SAFETY SLOGAN" WILL BE CONSIDERED by the judges. The "Safety Slogans" are to become the sole property of Modern Mechanix Publishing Co.

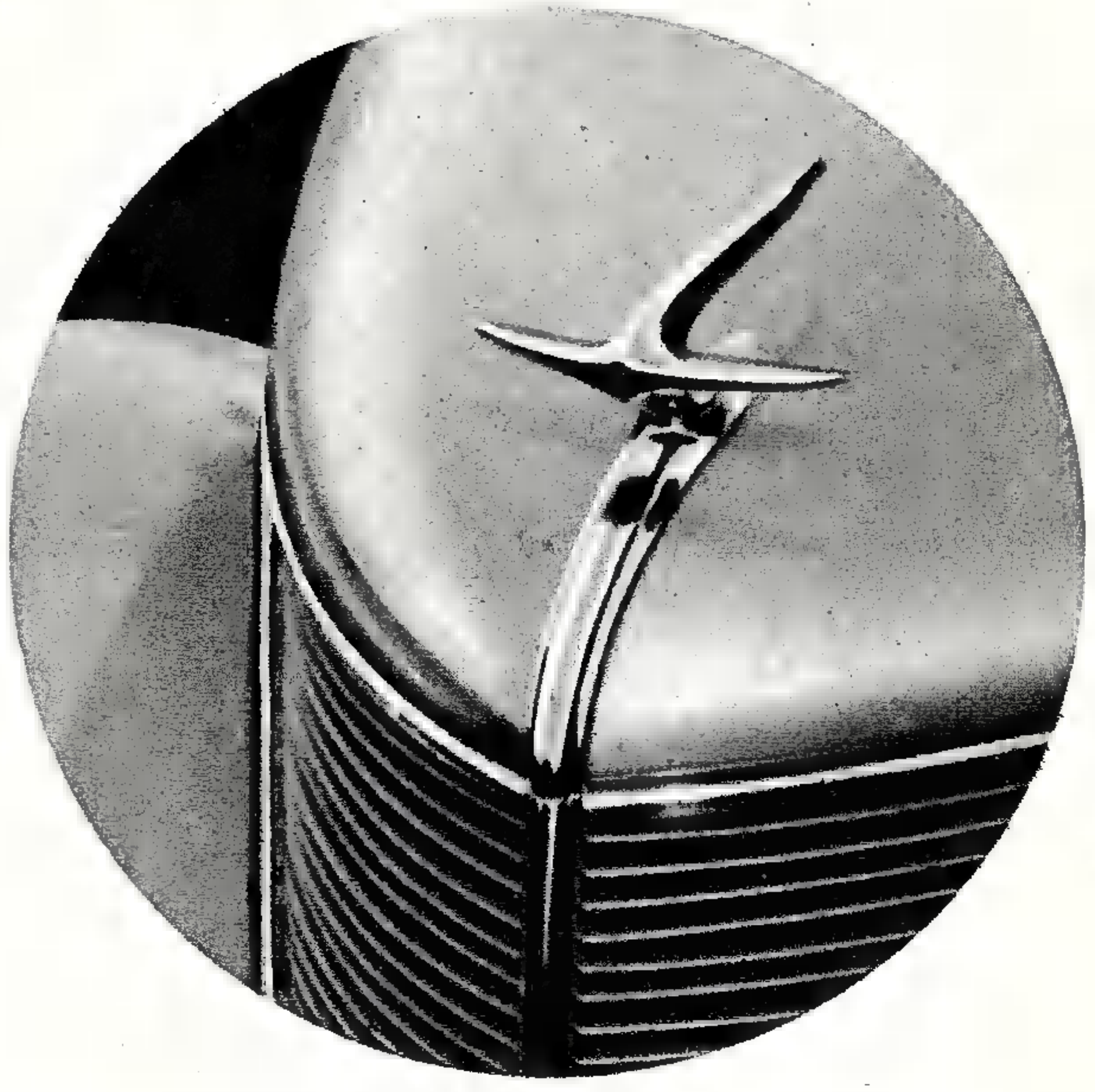
5 This contest is open to everyone except employes of Modern Mechanix Publishing Co.

6 You don't have to buy a copy of this magazine or be a subscriber to enter this contest. Recognizable facsimiles of the photographs will be acceptable.

7 Contestants need not submit elaborate entries. Neatness, brevity, and accuracy will be the deciding factors. No entries will be returned.

8 The editors of this magazine will be the judges. Their decisions are final. In case of ties duplicate prizes will be awarded.

9 Mail your entry to the AUTOMOBILE CONTEST EDITOR, Modern Mechanix Publishing Company, Greenwich, Conn. Write your name and address clearly on your entry. To be eligible entries must be postmarked on or before June 1, 1936. Winners will be announced as soon as possible after the close of the contest.



The Name of This Car Is

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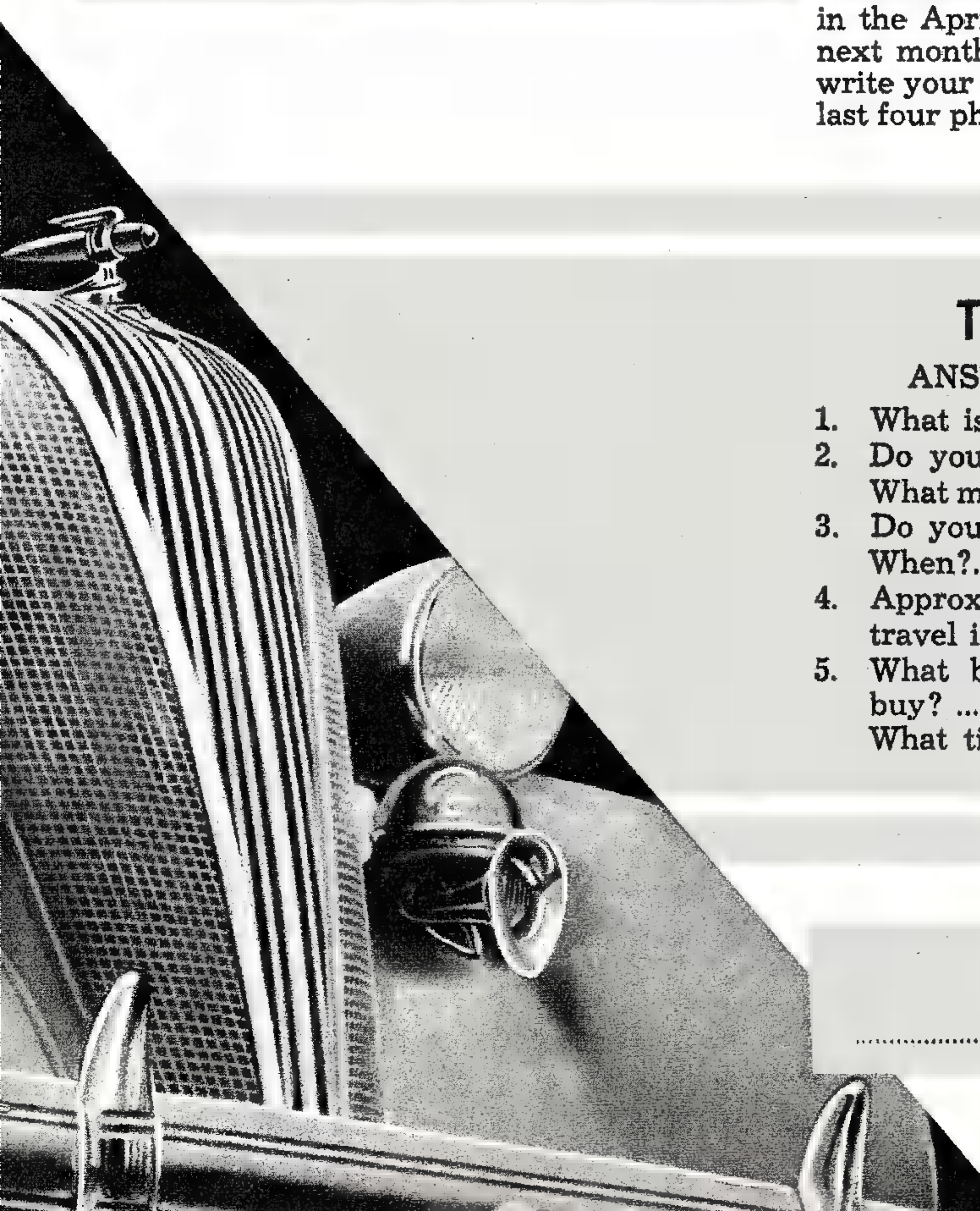

THE QUESTIONS

ANSWER THESE QUESTIONS

1. What is your age and occupation?
2. Do you own an automobile?..................... What make? .... What year? ....
3. Do you plan to buy a new car?............... When?.................. What make?...............
4. Approximately how many miles do you travel in your car annually?......................
5. What brand gasoline do you regularly buy? .... What oil? .... What tires? ....

The Name of This Car Is

....

THE PRIZES

First Prize	$250.00 IN CASH
Second Prize	150.00 IN CASH
Third Prize	100.00 IN CASH
5 Fourth Prizes	25.00 EACH
10 Fifth Prizes	10.00 EACH
15 Sixth Prizes	5.00 EACH
50 Seventh Prizes	2.00 EACH
100 Eighth Prizes	1.00 EACH
TOTAL—183 PRIZES	$1,000.00 IN CASH

The Name of This Car Is

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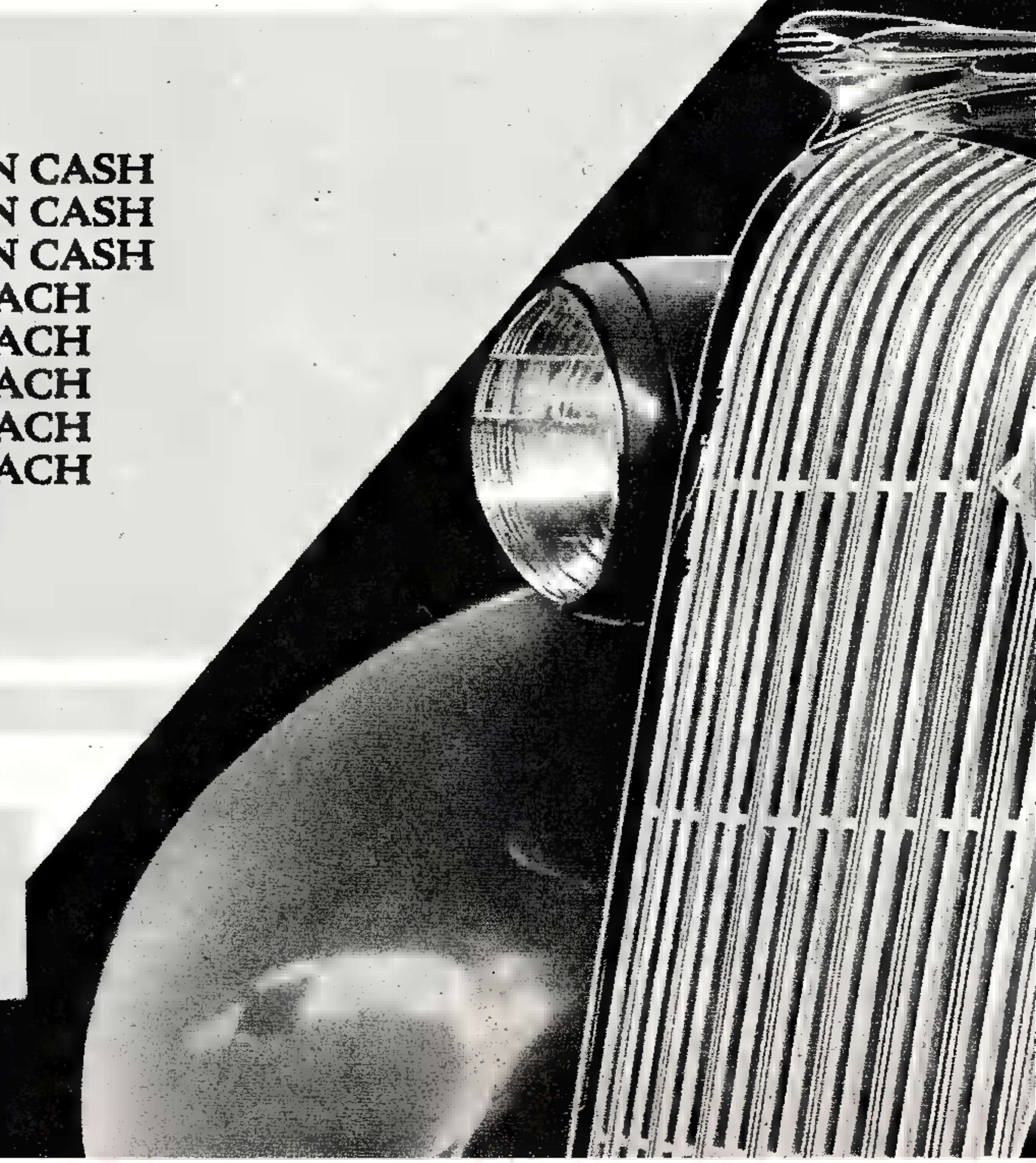


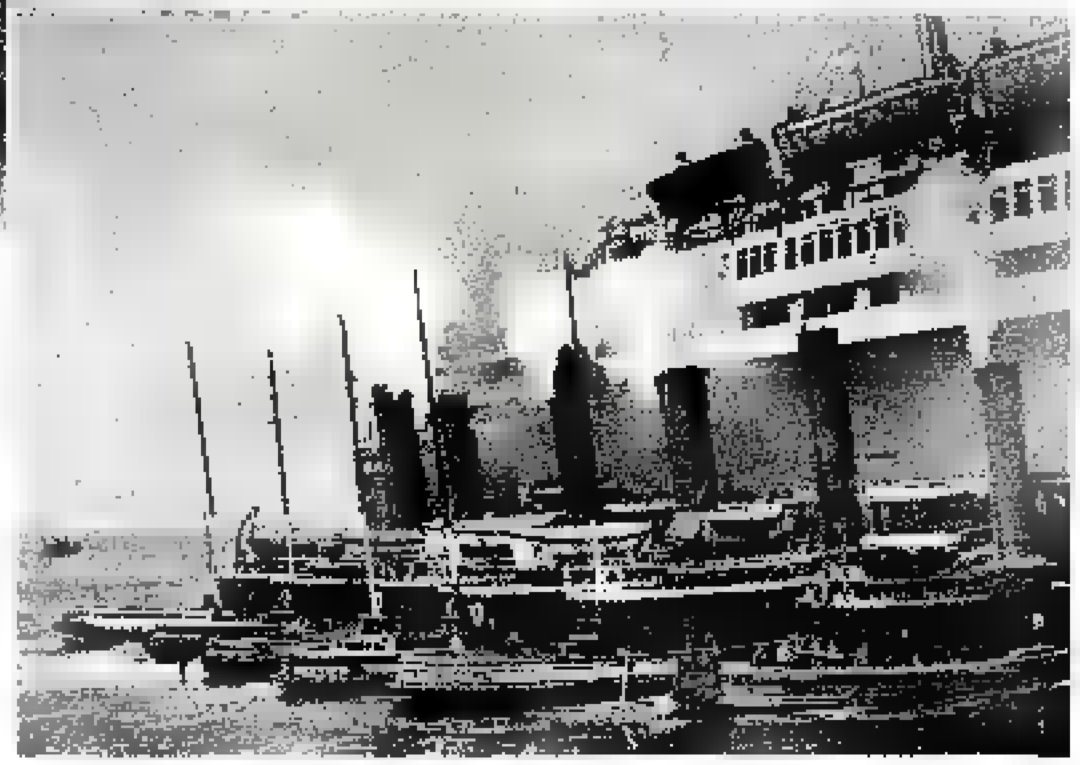
DOCKING the *Normandie* With New York's TUG FLEET

by JAMES DYSON

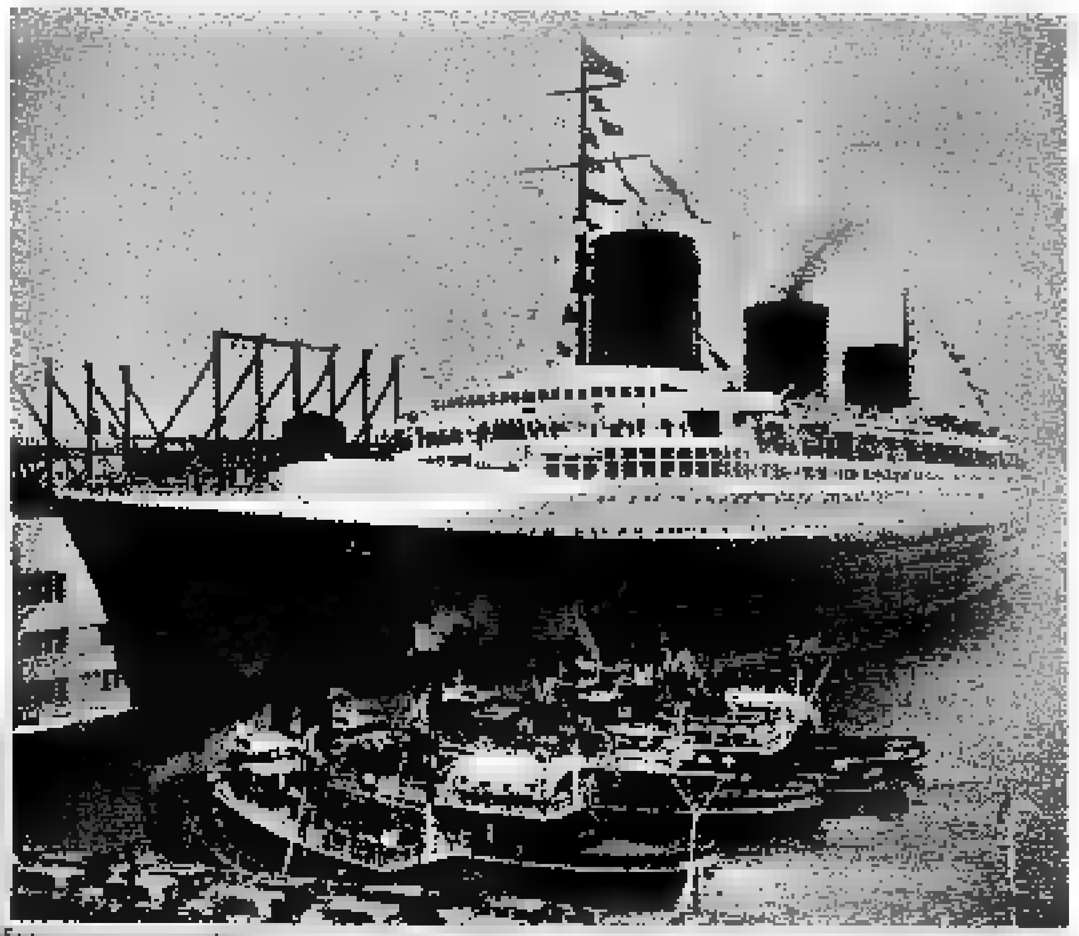
The *Normandie,* for all her great size and power, is [redacted] of the easiest of the big ships to handle, claims Anton Huseby, Norwegian captain of the Moran Fleet of New York Harbor tugboats, and the man responsible for docking this great liner. Last time he berthed her in 20 minutes —fast work on any vessel.

Leaving her pier [redacted] first, tugs push [redacted] ship back in [redacted] great arc, until finally she [redacted] headed downstream.

At Quarantine, the tug-fleet's captain transfer to [redacted]e ship's bridge—to supervise the docking.



Swinging the Europa into her dock requires the work of ten tugs, three of them (above) [redacted] working against her bow.



Comes [redacted] cry of "All ashore." And the moored [redacted] [redacted] ready for action as indicated by the photo shown above.

Carefully guarded from dense river traffic by her convoy of harbor ants, the [redacted] queen [redacted] up the Hudson to her pier.

WE WERE off to keep an appointment with [redacted] 79,290-ton visitor from across the seas—the giant French liner *Normandie.*

Captain Anton Huseby, master of the tug, Alice M., and the man who was to [redacted] the responsibility of docking the *Normandie* at her Hudson River pier, stood alongside me. Realizing that the captain would [redacted] be too busy to answer my questions, I took the opportunity to ask, "Do you find it more difficult to dock the *Normandie* than the other passenger ships that come into New York?"

He smiled. "Believe it or not," he replied, "but the *Normandie,* for all her size and power, is one of the easiest ships I've handled in the twenty years I've been in the business. Last time she came in we docked her in twenty minutes—fast time for any vessel.

"But docking an ocean liner, or for that matter any ship, can never be done on schedule. It all depends on the tides, the condition of the weather, the amount of harbor traffic and the season of the year. No two jobs are the same. Given a nice summer day, [redacted] flood tide and no wind, a ship can be docked in record time. On the other hand, it [redacted] be pretty tough if you run into a northwest gale in the middle of winter, an adverse tide and [redacted] river packed hard with ice. Night work is difficult, too. Distances are deceiving then and sometimes we're bothered by the glare from the lights on the pier."

"Then," I said, "there's really no set formula for docking a ship."

"No. Conditions change daily and the only reason we seldom have an accident—is because we always anticipate trouble. We know from experience exactly what to expect.

"See this police whistle? Well, I use this to signal my directions to the tugs. They acknowledge each signal with blasts from their own whistles—that's why you always hear a chorus of tugboat whistles when [redacted] ship is coming in. They all mean something. For instance, one blast means ahead; another single blast, stop; two blasts, reverse engines, and three or four quick blasts, push in and give her all you've got! We'll have eight tugs on today's job."

"How do you determine the number of tugs?" I inquired.

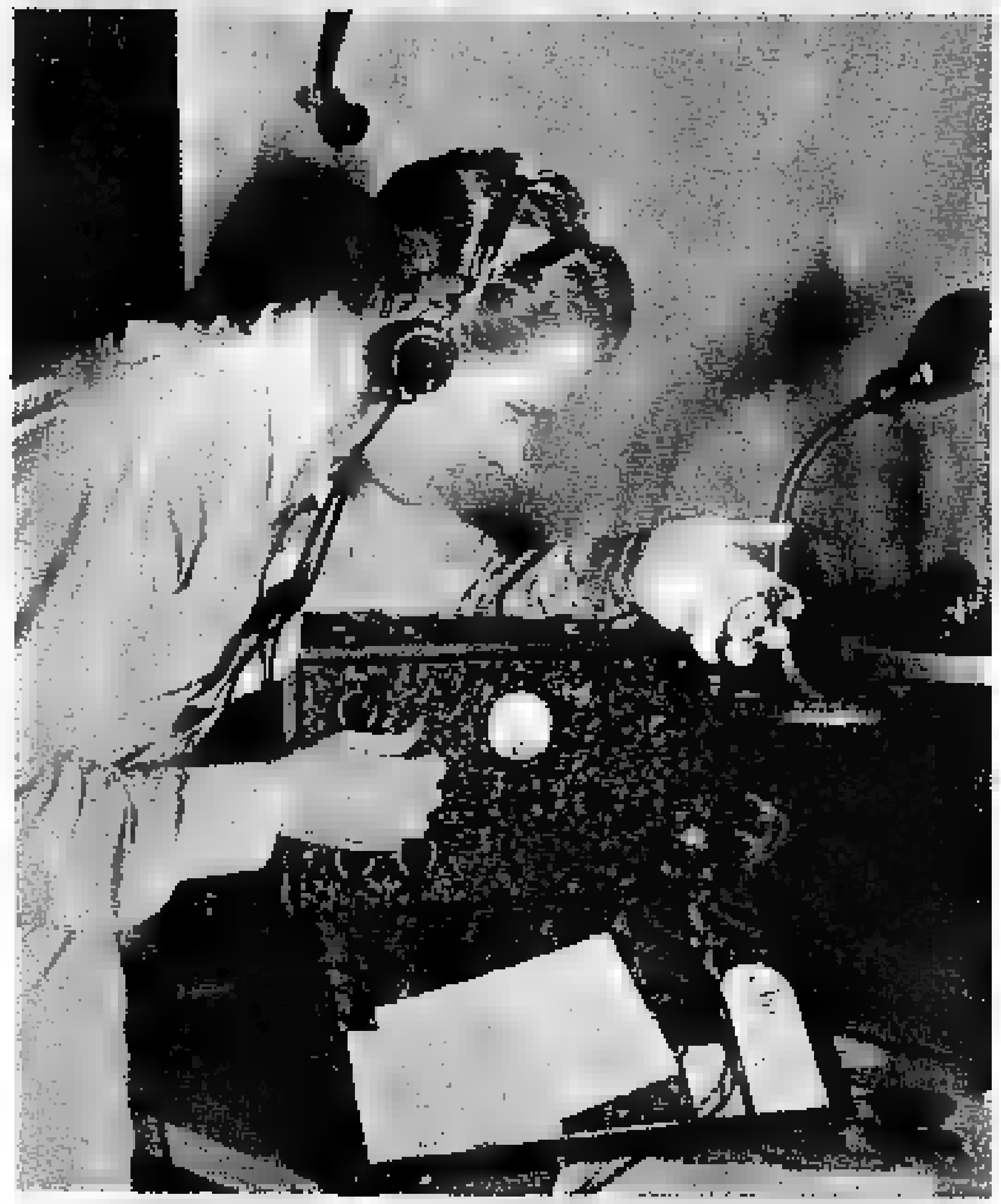
"There again it depends on the conditions," he answered. "When the *Normandie* first came over we used twelve boats, but I've docked her with only six. We usually use ten tugs for the Majestic, Berengaria, Bremen and Europa and about eight for the Aquitania and other ships of her size. But I can remember one tough day in the middle of winter when we had fourteen tugs on the Bremen and it took three hours to dock her.

All this was explained to me as we moved along towards the French Line pier. The *Normandie* had by this time cleared Quaran-

[*Continued on page* 120]

When Hollywood STARS TURN *To* HOBBIES

By HOWARD SHARPE



To Nelson Eddy, singing star of *Naughty Marietta* and *Rose Marie* there is no mystery in sound reproduction, for he has made that science his hobby. His home laboratory is filled with sound apparatus with which he is always experimenting.

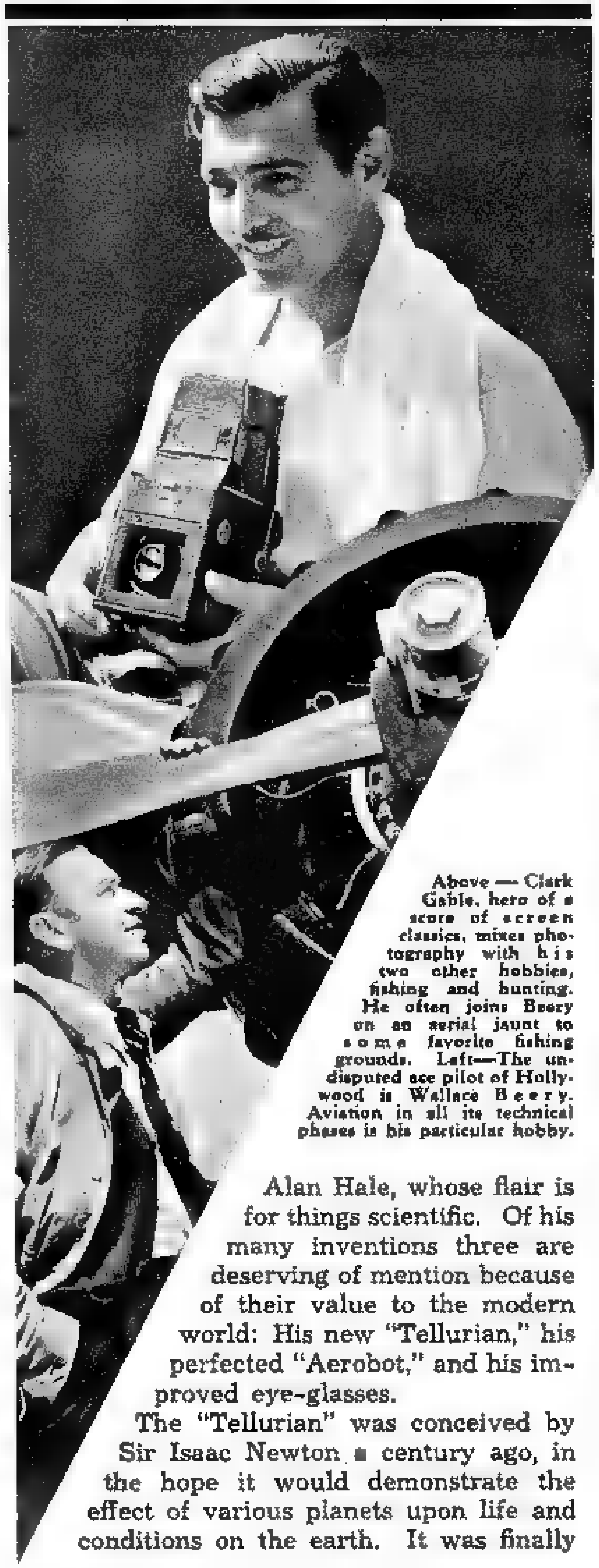
WHILE their images are engaged in entertaining millions of people in theaters all over the world, Hollywood stars can be found entertaining themselves—in their workshops. And while their images flash across the screen, garbed in sophisticated evening apparel, gay costumes of former periods, or flashy uniforms, the stars are hard at work in grease stained coveralls, dungarees and sweat shirts, or the first old garments to come to hand.

Hobbies in Hollywood are not a fad. They represent years of study and hard work, and when an actor speaks of his particular interest, he speaks with authority. Contrary to popular belief, the lure of the night clubs and bright spots is dwarfed by the compelling interest the stars show in their hobbies.

Wallace Beery is the most famous flier in Hollywood. When not before the cameras he is either up in his six-passenger Bellanca plane testing out new devices, or poring over maps and technical literature on flying at his airport. After aviation comes fishing, and then amateur photography.

Above—One of the best equipped and the most used work shops is owned by Warren William, Warner-First National star. In addition he is an amateur inventor and crack sailor. Right—*Wanderlure II*, a 40-foot schooner, occupies the spare time of Henry Wilcoxon, star of *The Crusades*, since he made navigation his chief hobby.

Nelson Eddy's hobby is also part of his vocation. He studies voice recordings in his home laboratory, which is equipped with the latest sound apparatus. He uses his own voice and those of his friends to carry on a scientific study of sound reproduction, with the result that he is one of the few singing stars to take full advantage of the microphone. Also outstanding in this group of mechanically-minded screen stars is Alan Hale, whose flair is for things scientific. Of his many inventions three are deserving of mention because of their value to the modern world: His new "Tellurian," his perfected "Aerobot," and his improved eye-glasses.



Above — Clark Gable, hero of a score of screen classics, mixes photography with his two other hobbies, fishing and hunting. He often joins Beery on an aerial jaunt to some favorite fishing grounds. Left—The undisputed ace pilot of Hollywood is Wallace Beery. Aviation in all its technical phases is his particular hobby.

The "Tellurian" was conceived by Sir Isaac Newton a century ago, in the hope it would demonstrate the effect of various planets upon life and conditions on the earth. It was finally built by Hale and Merrill Hard, partners in an experimental and research laboratory. The instrument so simplifies the study of astrological bodies that a twelve-year-old boy, after four half-hour lessons, is enabled to pass a "Teacher's Normal" examination which usually requires four years of study.

Most of Hollywood's actresses are experts in interior decorating, but Maureen O'Sullivan uses her modeling hobby to make her own objects of art. She is an expert in clay figures.

Hale's perfected "Aerobot" is capable of controlling the plane's speed, altitude and flight direction while the pilot devotes his time to charting or listening to the radio.

Many of the Hollywood great have turned to boats for their hobbies. Warren William considers it no great accomplishment to handle his 30-foot sloop, *Common Sense* single handed in a strong wind. Henry Wilcoxon is another to prefer the graceful close-to-the-water sweep of a sail-boat, while "Tarzan" Weissmuller has a 48-foot yacht powered by two Diesel motors. Even Sir Guy Standing, whose real mechanical hobby is an automobile trailer, occasionally finds time to tinker with the engine of his small motor-boat.

Sir Guy's trailer is roomy with a door built into the side, and contains all the requisite

[*Continued on page* 122]

Outshooting the Guns of Gangland

by
STERLING
GLEASON

It [redacted] Billy-the-Kid's shooting [redacted] moving objects that made him a crack shot of legend. But today, almost any police officer could match him—shot for shot. Read how the police are fast becoming crack shots.

The radio police officer is a [redacted] breed of marksman, expertly trained to snap-shooting at fleeing targets from emergency positions. The six-gun man of the old West originated this deadly technique, which is simply draw and shoot without seemingly taking aim. But constant practice makes a man a dead shot regardless of the target.

BEFORE a crowded gallery, Los Angeles policemen were demonstrating their skill at revolver shooting.

One officer lit [redacted] cigarette and turned sideways. The other, having paced off the right distance, took steady aim and shot the cigarette in half.

The audience was loud in its applause. But one spectator was heard to say, "Aw, that trick-shooting cop has just [redacted] the Annie Oakley movie, and now he is playing hero."

"Trick-shooting cop?" Well, maybe. Every police officer in America has dreams of becoming a second Billy-the-Kid. Still, had the caustic gentleman making this remark, been at [redacted] certain downtown street intersection recently, he would have been pretty much ashamed of himself. For a "trick-shooting cop" was directing traffic there when it happened.

A screaming motorcycle siren brought the traffic officer to attention. A recklessly driven sedan was hurtling towards him, behind which rocketed the motorcycle officer pouring in lead and receiving a deadly barrage in return.

The traffic officer, trained for just such an emergency, shot the driver squarely through the heart as the car flashed by him. But a burst of death from inside the car toppled that "trick-shooting cop" to the pavement, fatally wounded. The driverless car swerved and crashed, and then there was a gun battle royal, for police appeared out of thin air. In the car was found the loot from [redacted] bank robbery committed only a few moments before.

Back of the brilliant shooting which dazzles spectators at police ranges, lies long, steady practice and training which is making police marksmanship feared by the underworld as never before. A modern police department today is really a miniature army, complete from its arsenals, bristling with sub-machine guns, riot guns, high-powered rifles, and side-arms, to grenades and guns which lay down a barrage of gas. There are armored cars with bullet-proof windows, and shielded tires, forming veritable tanks for street warfare; armored motorcycles with machine guns or automatic pistols, mounted between handlebars.

Most important of all, however, is a well-trained line of sharp-shooting officers. In certain cities of the United States, [redacted] system of training is fast making every man [redacted] crack shot, and [redacted] result, police guns are speaking with new authority.

Every month, each man on the Los Angeles force, from the Chief on down, must go to the pistol range to demonstrate his skill with the revolver. On the firing line he finds [redacted] dozen or more other officers, also anxious to qualify. In the sunken pits just below the earthen backstops, trusties are waiting, ready to aid by manipulating the targets and recording the hits.

Speaking into a microphone, a rangemaster directs the fire. At his command, targets jump up from the trench.

"Fire!" comes the command.

A dozen pistols speak at once. Holes appear in the paper-covered targets.

Now, from the pits, bamboo pointers dart upward. Pointing first to each hit, then to a numbered post beside the target, the stick

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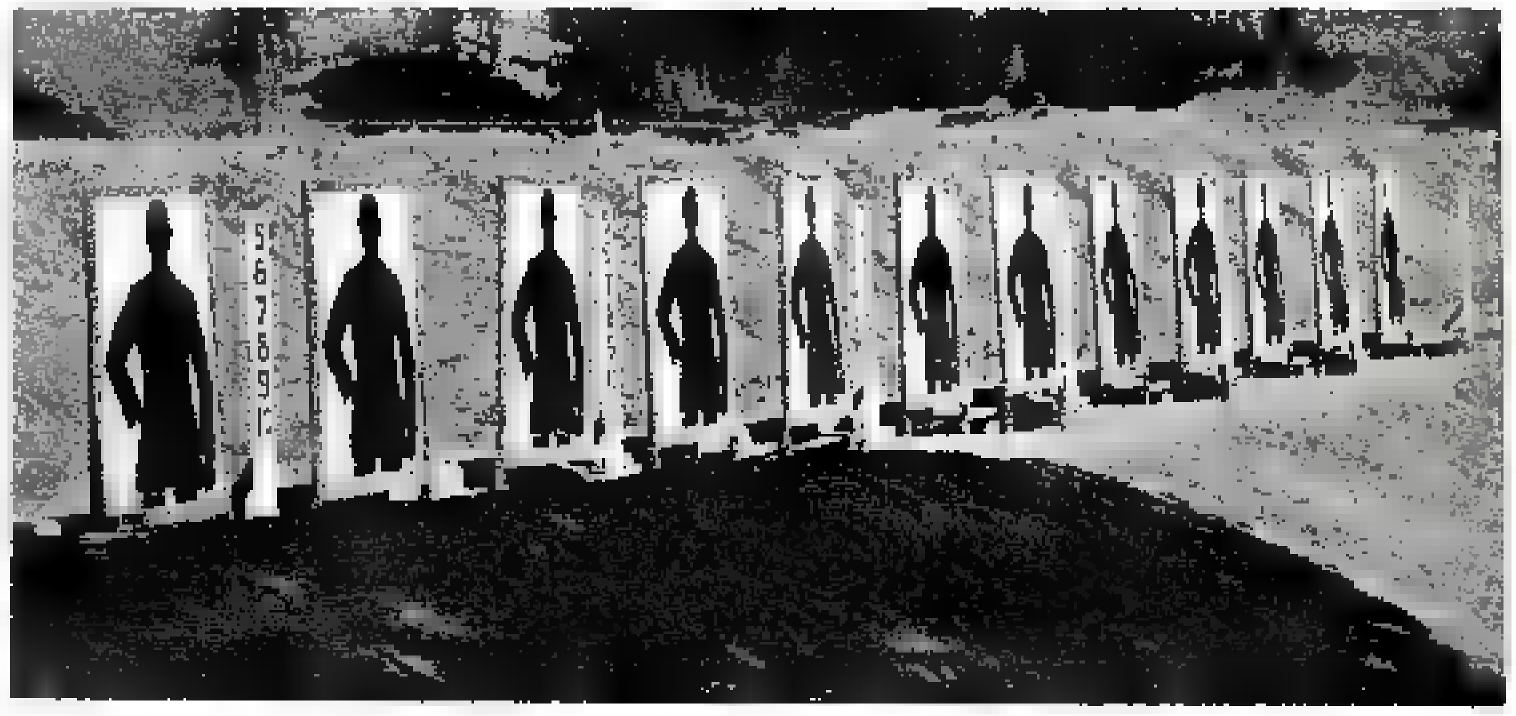
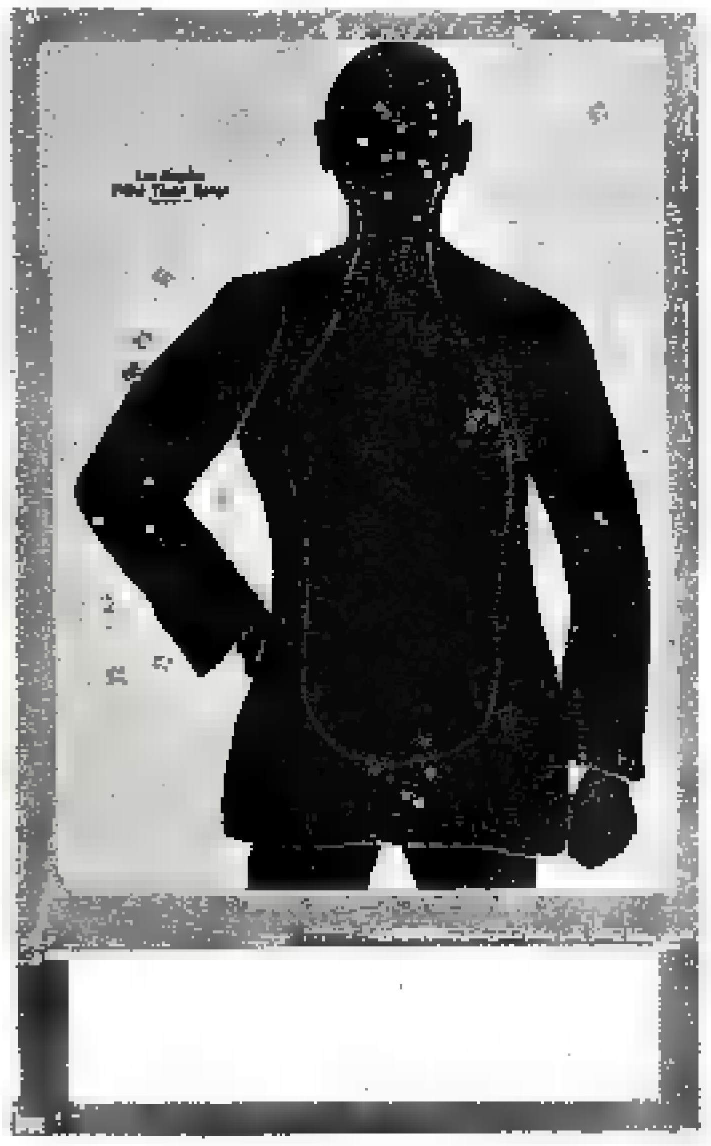
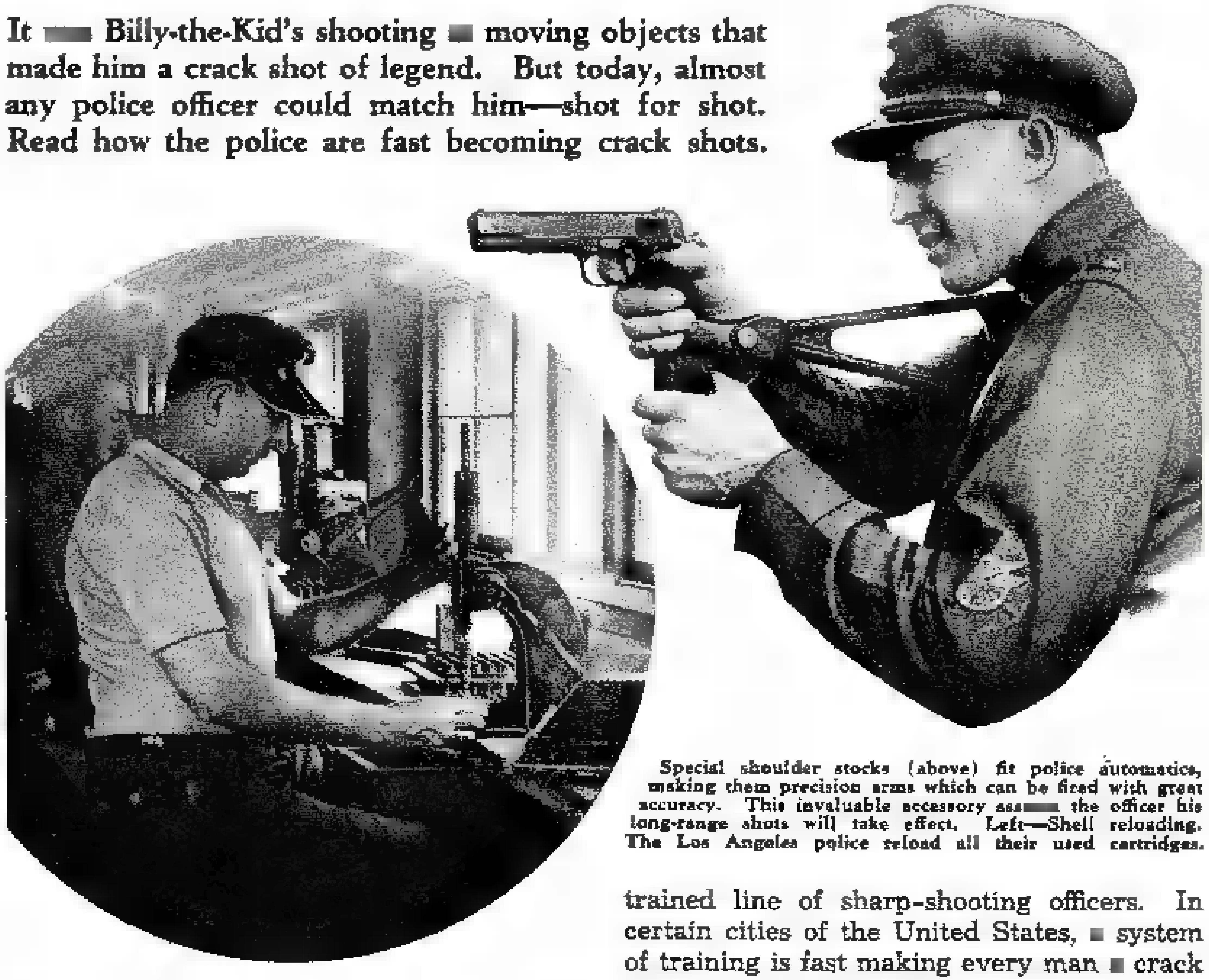




Up from the pits (left) jump police targets, and the officers pour in their fire. How surely shots are placed is shown in the photo at right.

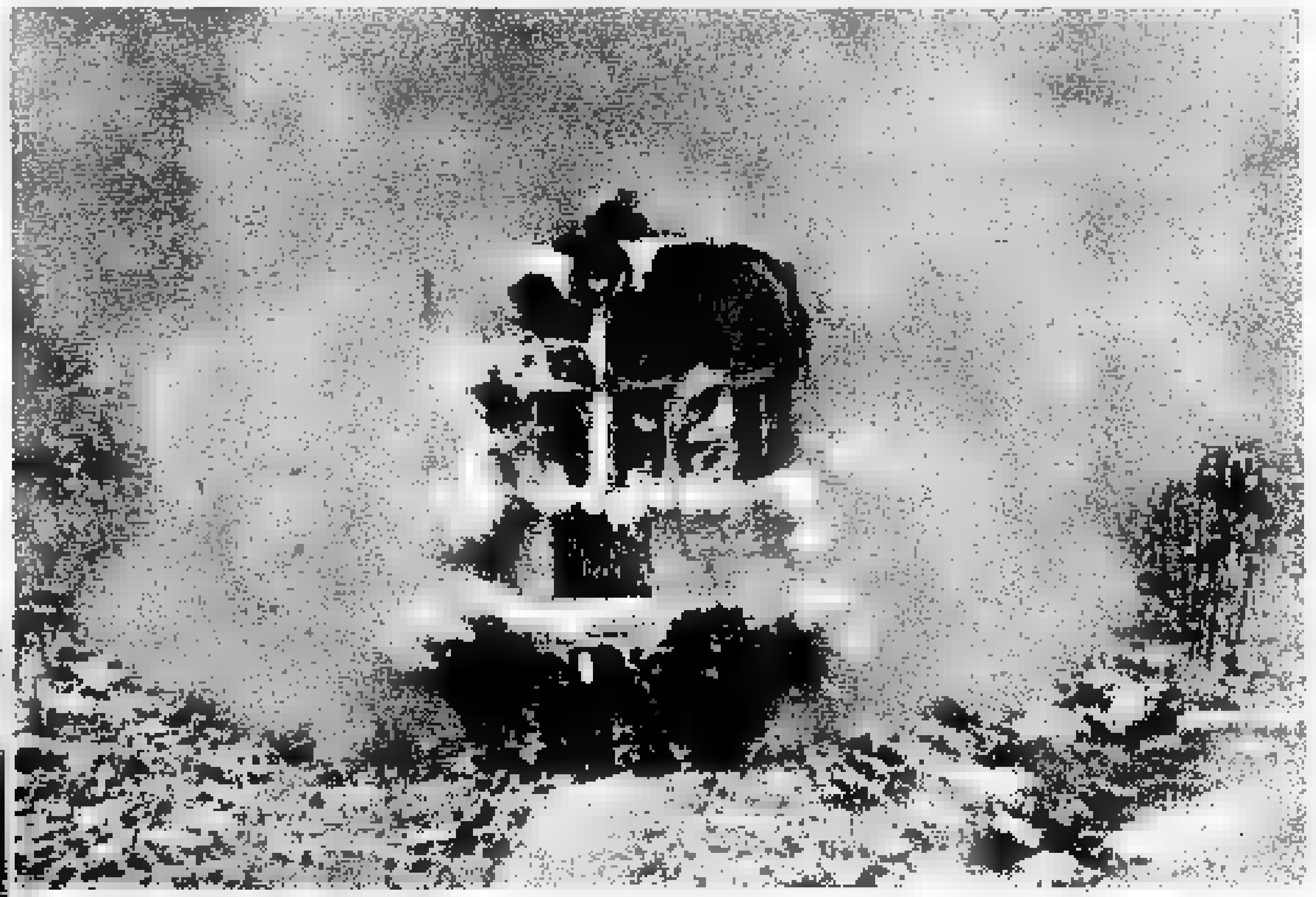


Special shoulder stocks (above) fit police automatics, making them precision arms which can be fired with great accuracy. This invaluable accessory ass[redacted] the officer his long-range shots will take effect. Left—Shell reloading. The Los Angeles police reload all their used cartridges.

FLOODS—WINTER'S Devastating AFTERMATH

Stalking the coldest winter in years, it sneaks beneath your door, this fluid snake. And once having watched its rise, you realize that no monster is more to be feared than FLOOD WATERS.

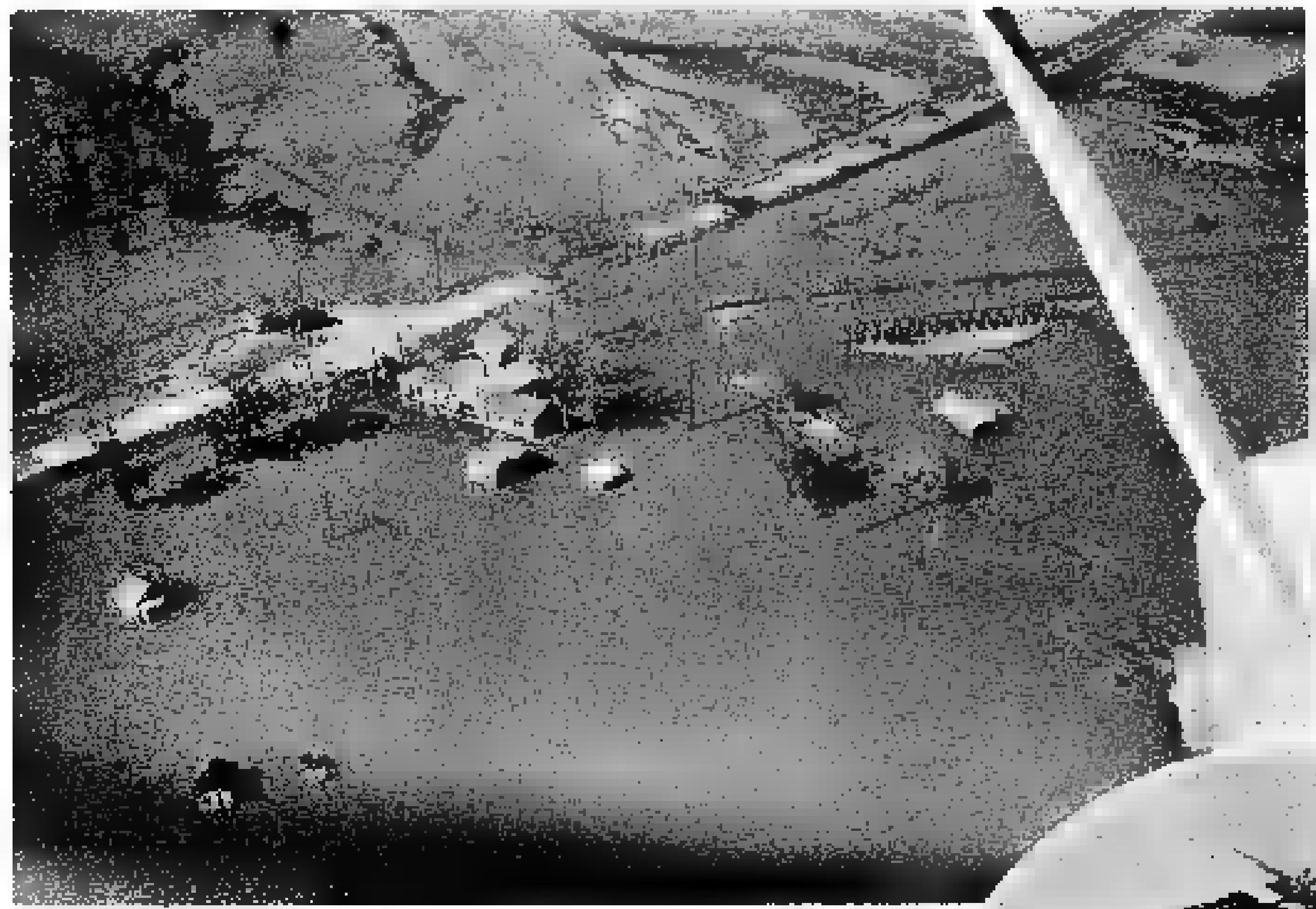
by IVAN E. HOUK



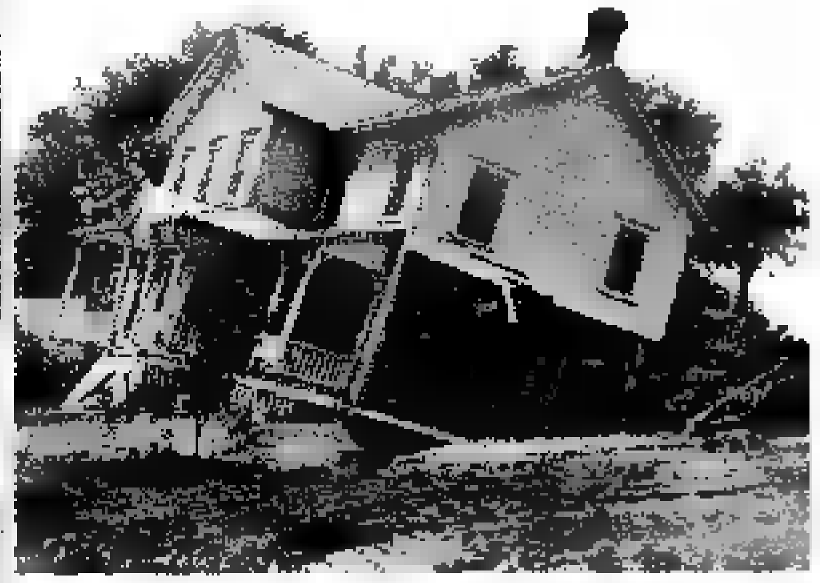
This past winter, [redacted] in half [redacted] century, wreaked havoc on transportation, but the Zephyr bowls [redacted] interrupted through drifts [redacted] eighty miles per hour. Melting [redacted] now threatens thousands of homes.

Dams which [redacted] built for power purposes are often valuable protection against flood losses and damage.

Utah flood waters swirled down on Salt Lake City, piling up cars in one of Mother Nature's unusual freak traffic jams.



When you view newsreel shots of a flood, think kindly of the airplane pilot. He always directs emergency relief for those in immediate danger.



The house built upon sand or rock is a "push over" for Old Man River when he goes [redacted] [redacted] [redacted] page. A lifetime of endeavor was wrecked when the house (above) and surrounding buildings also were damaged.

Piled up in Chagrin River, ice floes, the aftermath of the February blizzards, defy dynamite blasts discharged to break jams. Flood waters [redacted] [redacted] backwashing through the Ohio countryside before the treacherous [redacted] were finally broken.

THE gentle patter of spring rain on the roof is a positive cure for insomnia. Yet, in Paga-Pago it is practically impossible to outsleep the "devil-drum" drops, for there the tropical rains are seemingly endless. But, for downright fear of rain, take America's flood area population just about this time of year.

Millions of people worry when it rains in this area. They know that rain melts snow, that snow turns to water and that water runs downhill. This past winter found the northern states blockaded by one of the worst series of blizzards ever recorded. Damage by snowfall alone ran into the millions, while the costs in snow removal, delayed transportation and interrupted communication service have not yet been totaled. Added to this was the loss in human life. And still the toll of winter has not been paid in full. There remain the floods, the dread result of the snows melting too fast for nature's water troughs.

Approximately twenty-five million dollars worth of property, not to mention more than a hundred lives were lost when flood waters swept down from the hills in eastern Colorado and southwestern Nebraska early in June 1935.

The Republican River, swollen by cloudburst rainfall, rose to heights never before known. During succeeding weeks similar floods devastated parts of Texas, Wisconsin, Ohio, Pennsylvania, and New York. The south central New York floods of July 7 and 8 caused the death of fifty-five people and the loss of more than twenty-five million dollars worth of property.

When two inches of rain falls in a single day people think they have had an exceptionally heavy storm. When four inches falls in one night they think they have had [redacted] cloudburst. Twenty-four inches, two whole feet of water, fell in southwestern Nebraska that night of June 1. No wonder the Republican River went on [redacted] rampage. Bridges were wrecked, railways torn out, buildings destroyed, homes washed away, and whole families drowned. This was the most extraordinary rainfall ever known in that section of the country.

Disastrous floods result from several causes. They result from the breaking of levees, the failure of dams, or the formation and subsequent collapse of ice gorges. They result from the temporary blocking of stream channels by landslides, snowslides, or ice avalanches from overhanging glaciers. They may be due to the choking of watercourses by vegeation during the late summer months, or to the sudden melting of accumulated snow deposits during the late winter months. Sometimes they result from tidal waves caused by severe earthquake shocks, or from

[*Continued on page 136*]

Amateurs *Capture* ACTION *for the* NEWSREELS

by MAXWELL R. GRANT

When [illegible] peaceful valley suddenly becomes the scene of [illegible] roaring flood, the amateur news cameraman is on the job. Where hurricanes rage or great explosions take their toll, the newsreels depend upon alert amateurs. This article tells how it is done.

PRISON sirens howl as a band of desperate convicts blaze their way out of the penitentiary with smuggled guns. Hot on their trail follows an amateur cameraman. He photographs scenes of the resulting confusion, the hurried marshalling of police cars, the armed guards pacing the prison walls, the excited crowd of curiosity seekers, and gets human-interest shots overlooked by professional newsreel men.

A famous flyer is forced down far from big-city landing fields—and from the commercial movie reels. His accident enables a local amateur photographer to score a clean scoop which nets him [illegible] handsome profit.

A spectacular fire, a big marine collision, a flood, explosion, or earthquake—all spell opportunity for the hundreds of free-lance amateur cameramen who are invading the field of newsreel photography.

At the airport to welcome Amelia Earhart at the end of her Hawaii to California hop was an alert amateur cameraman. She rewarded him with this shot. Another amateur swung his [illegible] into action to get shots of [illegible] Chinese New Year celebration. Part of the procession is shown at left.

Above—This is [illegible] of the latest 16-mm. cameras for amateurs. The cameraman is placing a filter over telephoto lens to get [illegible] close-up of distant action. Left—There are numerous kinks [illegible] newsreel work. Here an amateur is using [illegible] portable titling board. The titles are lettered on paper, inserted into holder, and quickly shot.

The unexpected, always happening, is the amateur newsreel man's best friend. Although most big news events are covered by pre-arrangement, now and then a sensational story smashes into the headlines, finding news-gathering agencies unprepared. A quick-witted amateur already on the scene may sell his negative to them if he acts promptly. A dollar a foot is the average rate, and sometimes more for exclusive, sensational pictures of national interest. Foreign subjects generally pay double.

Latest in newsreels is one distributed nationally, once [illegible] month, for home movie projectors. Recently press representatives sat in a darkened Hollywood projection room and watched the first edition of this sixteen-millimeter reel, shot entirely by amateurs, unfold late flashes from all parts of the country. They saw auto drivers speed around [illegible] dirt track in a championship race; watched in turn an athletic contest, a spectacular parade, and miners panning pay dirt in a new gold rush. They got glimpses of a rare turkey-fish from the South Seas; marveled at an odd, elephant-shaped fungus recently discovered in Nebraska; and watched [illegible] thrilling undersea battle between two fierce tropical fish.

Army air maneuvers furnish a real test for the newsreel cameraman. Here two operators are engaged in filming the planes shown above using [illegible] telephoto lens and filter to bring the action closer. A long extension arm and universal tripod aid in rapid follow shots.

Already two hundred cameramen are covering big news as it breaks, and more are wanted in every section of the country, according to one news editor.

"There are hundreds of news subjects in each locality waiting for you to photograph," he tells his contributors. "You must use your ingenuity and manufacture news, stunts, and human-interest subjects.

"If possible, shoot each subject from three different angles—eye-level; high, or 'bird's-eye' angle; and low, or 'worm's-eye' angle. If all your shots are taken at eye-level, break them up in the following manner: 1—Long shot; 2—Medium shot; 3—Close-up. Close-ups are the most important shots in newsreel work. The public likes to see the action near at hand.

"A tripod is essential, for only in cases of rare and spectacular news events—shots that cannot be re-taken—will we accept pictures that are unsteady on the screen. Don't panoram or tilt unless abso-

[*Continued on page* 124]

Robert Page Lincoln, hunting and fishing editor, holds up a small mouth bass he caught in a Minnesota lake. Mr. Lincoln has fished the small mouth from East to West and his findings are told in this article.

Fly Rod Fishing for Small Mouth Bass

by ROBERT PAGE LINCOLN

Second only to the trout in fighting skill is the small mouth bass. This vigorous warrior spells thrills galore for all fishermen. Prepare to land him by reading Mr. Lincoln's article now.

WHILE the large mouth black bass is generously distributed throughout the country, its close relative, the small mouth bass is likewise to be met in choice lakes and streams in the United States and Canada. Game and fish departments, recognizing the unusual gamey qualities of this species have extended the range into places where it was never found before. As a result small mouth bass are now being taken in great numbers west of the Mississippi, while previously they were found only in the East.

The small mouth bass is a firm, compact fish, with far more symmetrical lines than the large mouth. When a large mouth bass goes over three pounds in weight it will "belly down" as the saying goes, its abdomen hanging more or less flabby and soft to the touch. The small mouth bass, regardless of its size, retains its original lines, has a firm abdomen and does not have a flabby stomach as does its relative.

The small mouth bass has no stripe on its side. Its coloration varies with the region and the water. You may take a small mouth bass in one section of the country that is quite greenish; in another section, brownish in color while in still another the fish is likely to be much barred and blotched, which arouses no end of speculation as to whether or not it is a different species.

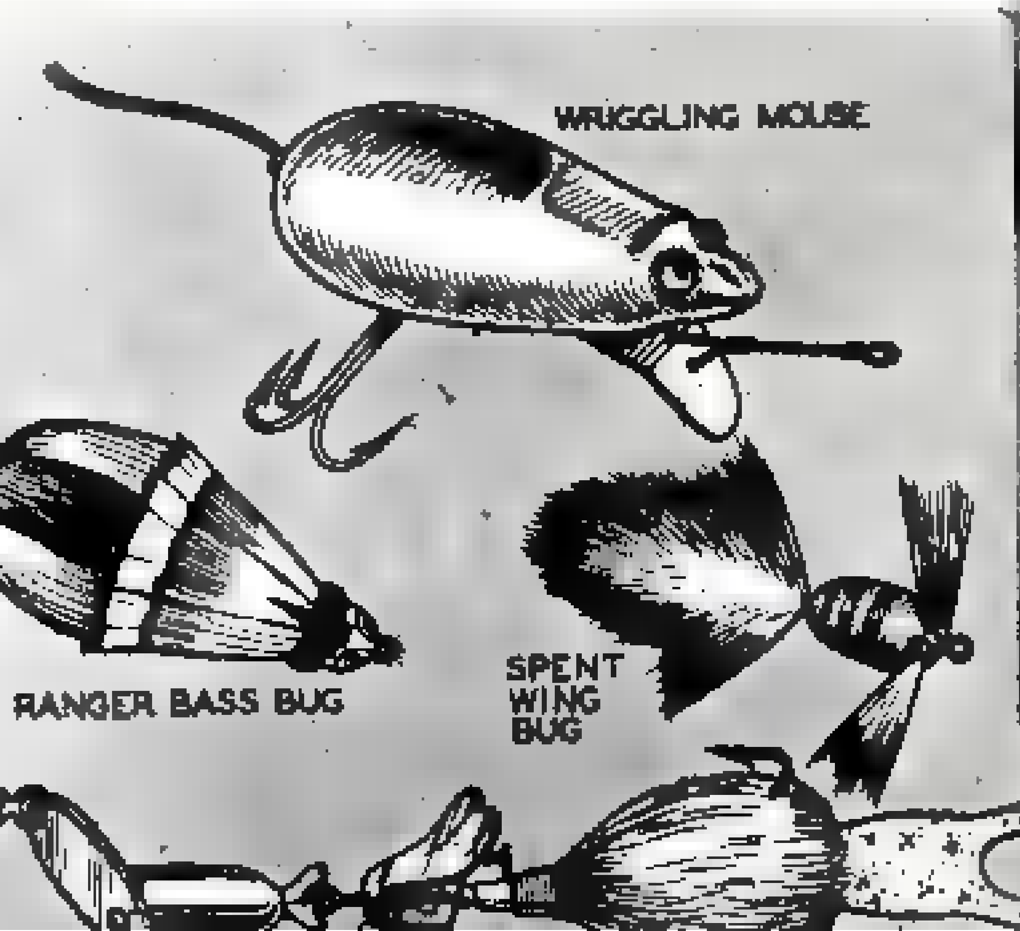
Because of its stream nature the small mouth bass, to a great extent, takes on some of the characteristics of the trout in that it feeds on insects along the shores very much as does the trout. By reason of this fact fly fishing has long been a favorite method of taking it. The flies used are generally tied to No. 1-0 hooks, the O'Shaughnessy hook bend, in the so-called hand-forged type, being the most desirable. These bass flies are made in the standard regulation variety, embracing such well-known patterns as the Grizzly King, Yellow Sally, Coachman, Royal Coachman, Professor, Red Hackle and many other colors and combinations of colors. Ninety per cent of the flies as used on the small mouth bass are quite large, the No. 1-0 being the all-around size. There are times, however, when smaller flies will prove effective on many streams, especially where the water is clear. Such flies should range No. 3 to No. 6 in size.

The best type of bass fly is one without any wing feathers, with just the hackles at the head of the fly, which, in the No. 1-0 size are an inch or more in length. A fly of this sort can be worked nicely in the water, and, with twitches of the rod tip, each individual hackle filament can be set into action, giving an open-and-close effect to the lure that is extremely life-like. As opposed to this, a fly possessing stiff, upstanding wings has little or no action to it at all, and merely turns and flops from side to side, imitating nothing and taking less.

Bass flies in the No. 1-0 size and in regulation patterns are often used in combination with a small No. 2 gold or nickel-plated spinner on a shaft. By reason of the interchangeable snap-fasteners or sliding coil-fasteners on these shafts you can take off one fly and put on another in a few seconds time. Regardless how flies are used when fished without the spinner arrangement, those having stiff, erect wings are out of the question when used with spinners. The wingless, hackle or palmer type of fly works most effectively with the spinner arangement, and is to be highly recommended. By way of explanation, a hackle type of fly such as the Brown Hackle has hackles concentrated at the head of the fly only, with the body bare. In the Palmer type the hackles are distributed along the whole body, the same fairly bristling with these filaments. Both of these types are to be given first place among flies as used on small mouth bass in fly fishing. Combined with the tiny spinner, the fly of either variety is ideal and most effective.

Lures for the small mouth bass as used by means of the fly rod are many and various. Aside from the spinner and regulation bass flies, as used under the water surface, there are bass bugs of many kinds. These bass bugs have cork bodies and float. They are less

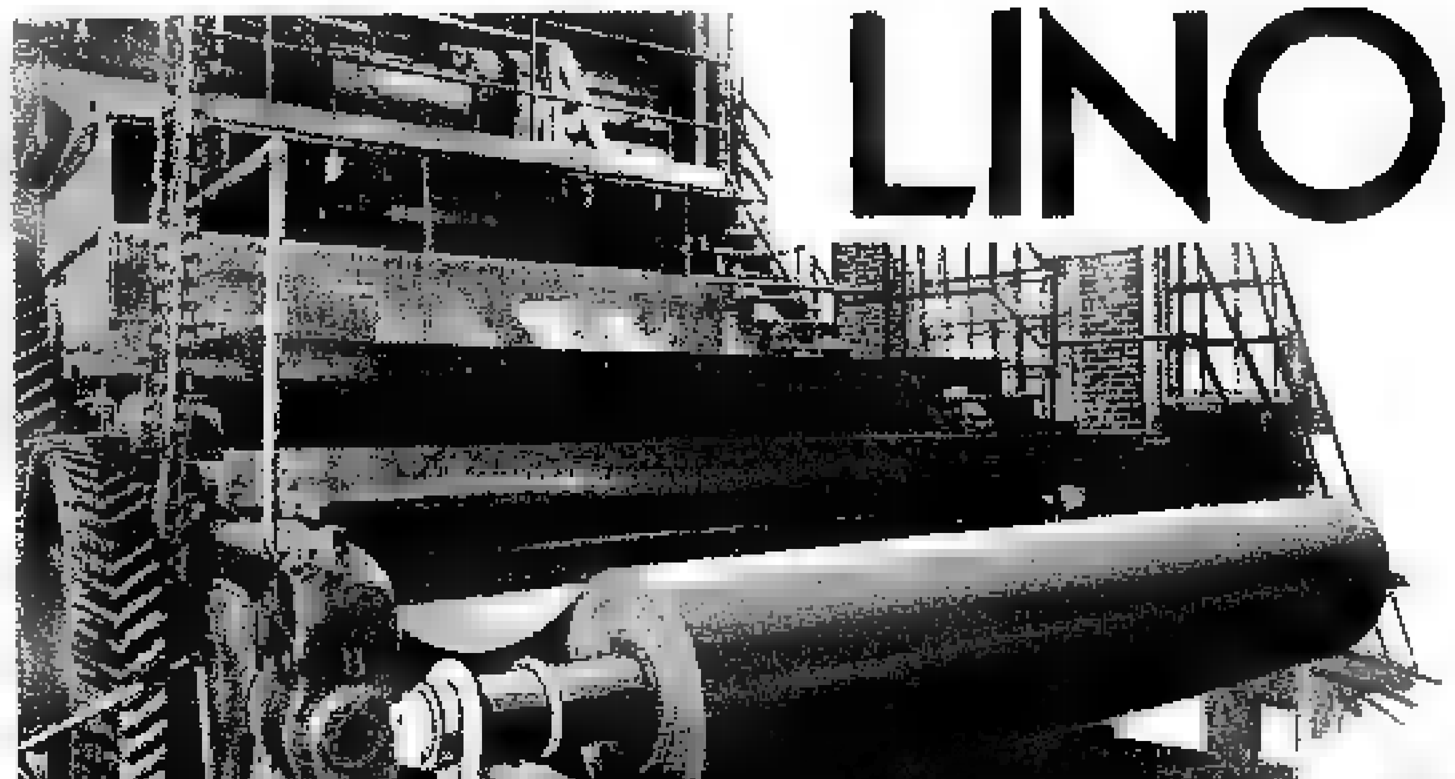
[*Continued on page* 128]



Above—Typical small mouth bass water. Like trout, small mouth thrive in fast water, though now, through planting, many are caught in lakes and ponds. Left—Here are some typical bass baits designed for the fly fisherman.

On still water such as shown below there are bass bugs in a host of varieties that are extremely effective. Some of them are shown at left. These are used with a strong fly-rod, and are cast up on logs, overhanging grass, or boulders and then dropped into the water. This means action.

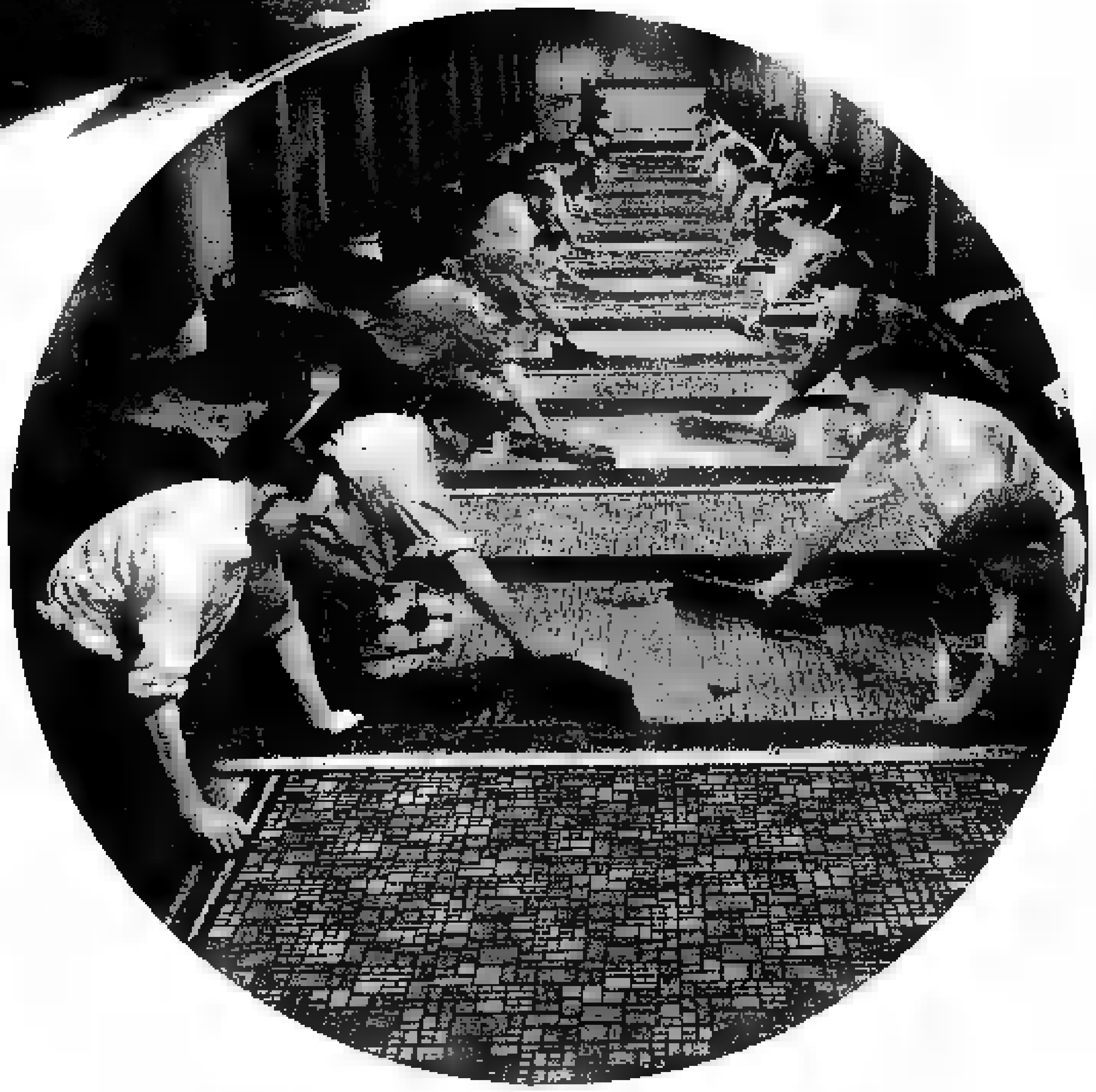
BABY BASS BUG
BUCKTAIL BUG



LINOLEUM—Another Industrial *"Accident"*

An inventive mind and [illegible] can of paint left open by accident [illegible] the co-founders of the great linoleum industry. Its manufacture is [illegible] strange [illegible] its origin.

In this machine the plastic mixture of linoleum begins to make shape as a rug. Burlap from the long roll in front passes into the "calender" and there huge rollers press the linoleum mixture into the fibers to form [illegible] strong backing. Circle—Here is the molded inlay table where colored linoleum mix is sifted through pattern stencils onto the burlap back. Each color has [illegible] stencil cut to match perfectly with others [illegible] fill design.



THROUGH all the centuries man's progress is reflected in the homes he has kept, and is readily traceable in the floors of those homes. Prehistoric men paid little attention to floors, but when the long arm of the Caesars reached out into the Orient, they found floors of inlaid ebony, teakwood, mosaic and pearl, but only in the homes of the rich.

In 1863, Fredrick Walton, [illegible] youthful inventor of Yorkshire, England, made [illegible] great discovery in an open paint pot, over the contents of which the usual scum had formed. Turning his inventive genius to the matter of a use for this tough scum, he developed the idea for a new material which brought fine floors within reach of the average family for the first time.

By mixing a small quantity of gum with the oxidized linseed oil, which he had discovered in the paint pot, Walton found that he had [illegible] very satisfactory binder for ground cork and color pigments when pressed onto a backing of burlap. So began the great industry that today extends into every country. He called his invention "linoleum"—from *linum*, the Latin for flax, and *oleum*, oil.

The manufacture of true linoleum involves several major operations, developed first by Walton and used by linoleum manufacturers with but slight modification to this day. The steps are as follows:

First, the cleaning and grinding of the cork and the selection of the burlap.

Second, the making of "linoleum cement" from linseed oil.

Third, combination of the cement with cork powder, wood flour, minerals and color pigments to make "linoleum material."

Fourth, the application by heat and pressure of the linoleum material to the burlap base.

Fifth, the seasoning or hardening of the finished linoleums in great ovens in which the linoleum is baked for months on end.

The Mediterranean countries of Portugal, Spain and Algeria contribute cork.

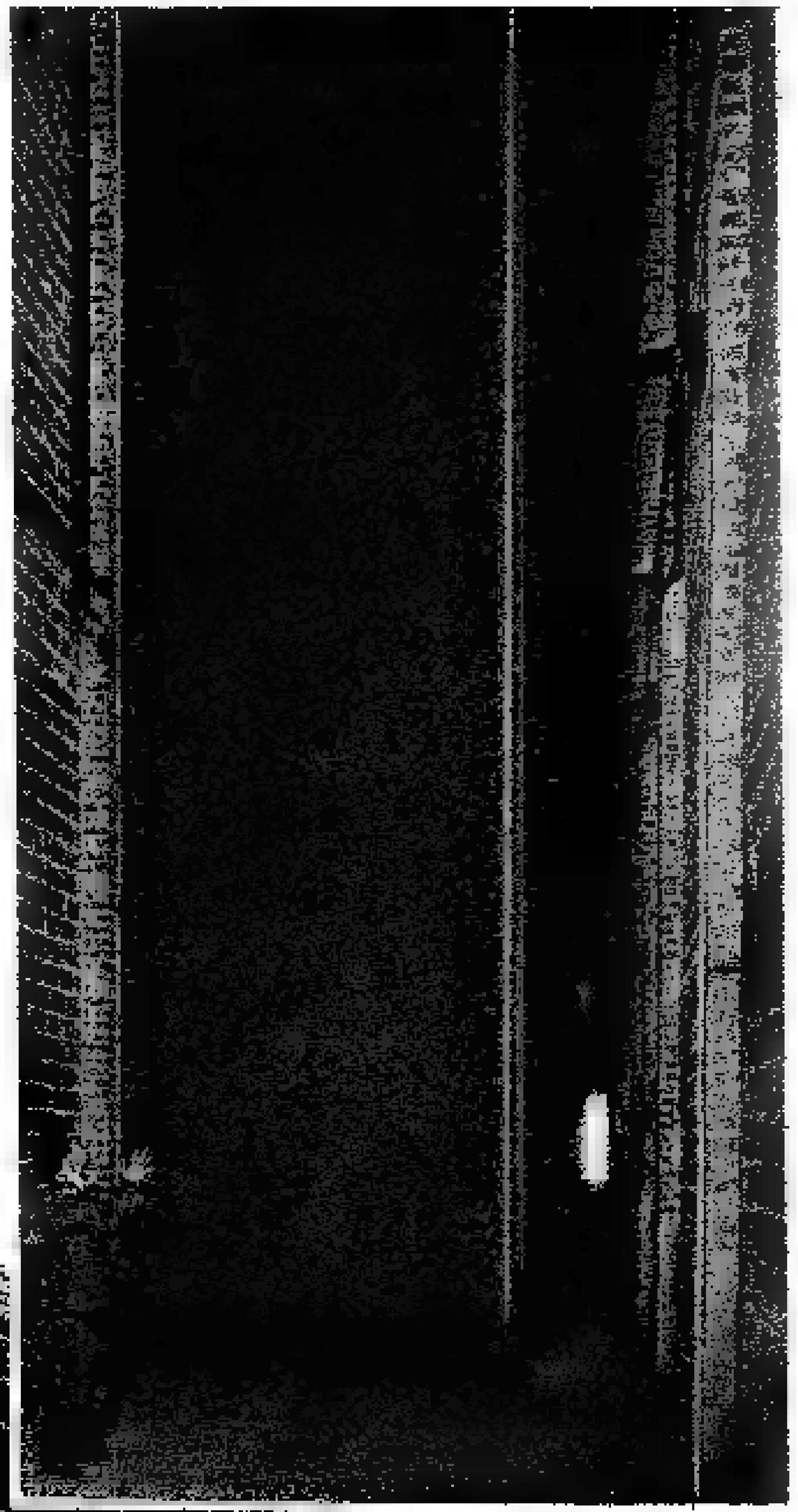
Cork has certain qualities possessed by no other materials, notably its lightness combined with strength, its elasticity, its imperviousness to air and water, and its insulation qualities. The cork is run through huge grinders, and then between [illegible] stones where it is ground so fine that it resembles talcum powder.

India grows jute, a reed whose strong fibres are woven into burlap. Only the Scottish weavers at Dundee [illegible] burlap of the fine and [illegible] texture suitable for use [illegible] [illegible] backing for linoleum. Every yard is closely inspected so as to make sure that the burlap is free from knots and heavy fibres and of balanced strength between its width and length.

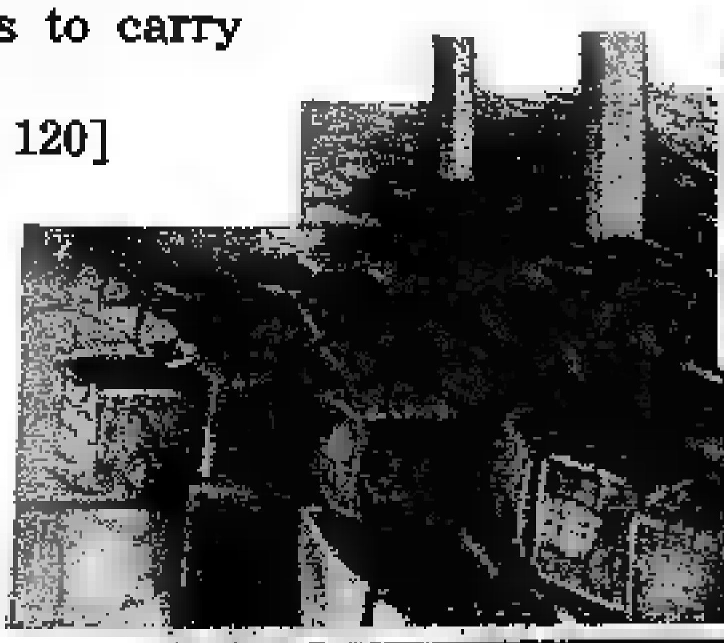
Linoleum "cement" is made from linseed oil and certain resins, which properly combined and treated, form a tough, rubber like material of great strength and endurance.

Mineral color pigments, obtained from various parts of the United States, are also an important factor, since bright and colorful patterns have [illegible] to be much in demand. Finely ground wood flour helps to carry these brilliant hues.

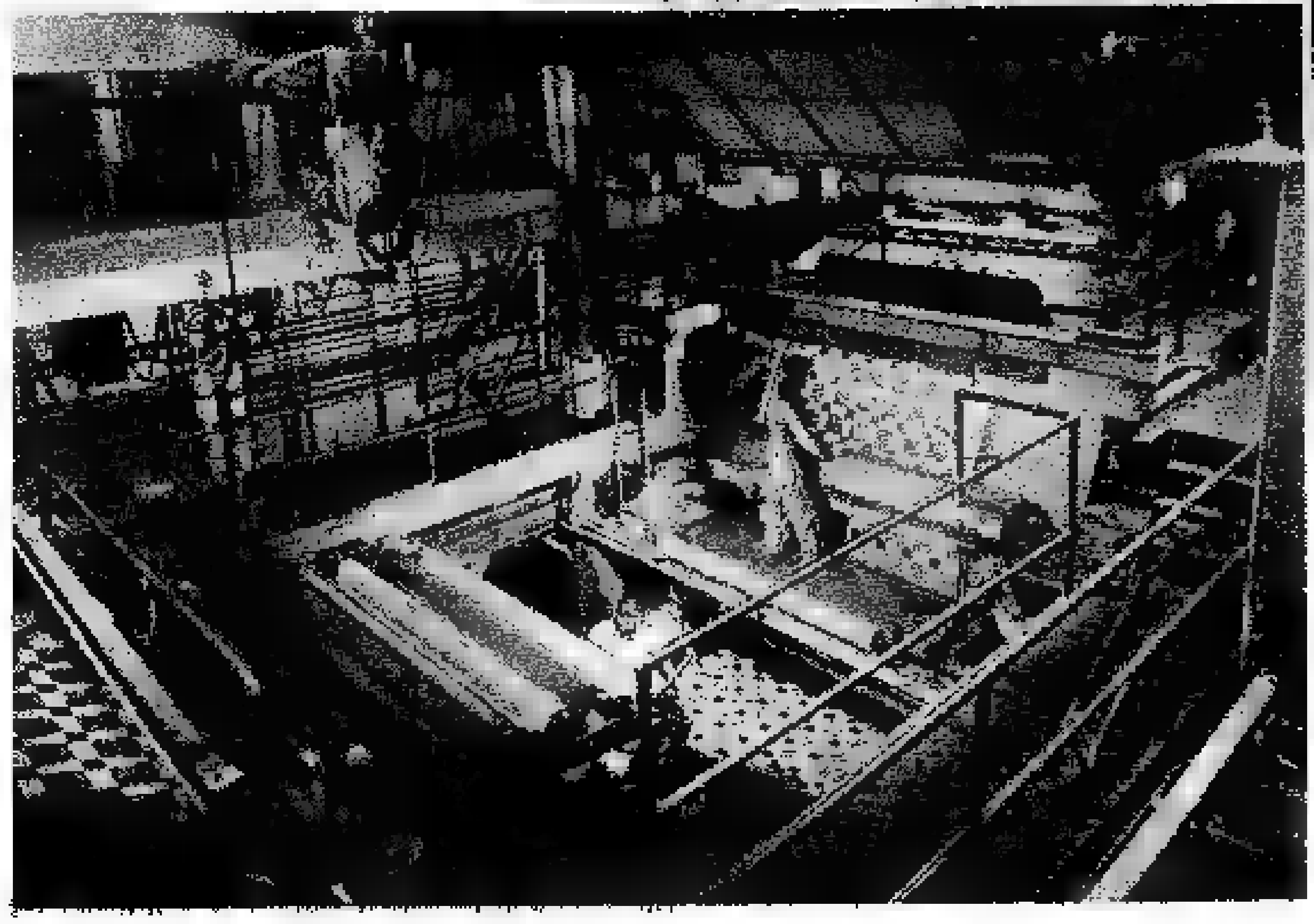
[*Continued* [illegible] *page* 120]



More than a mile of linoleum [illegible] baked at [illegible] time in this oven. Baking lasts from three to six weeks while linoleum cures.



Cork, because it is tough, spongy, resistant to oil and water, [illegible] of great insulation value, is used extensively in making linoleum. It is ground into a powder [illegible] fine as flour.



In this rotary inlay machine, linoelum "blankets" in solid colors are die-cut into small blocks, which are automatically shuffled into intricate designs. The pattern, fitted together like jigsaw blocks, is then drawn between presses where heat welds the material into a solid sheet. This process is easily distinguished from stencilling by [illegible] clean-cut lines.

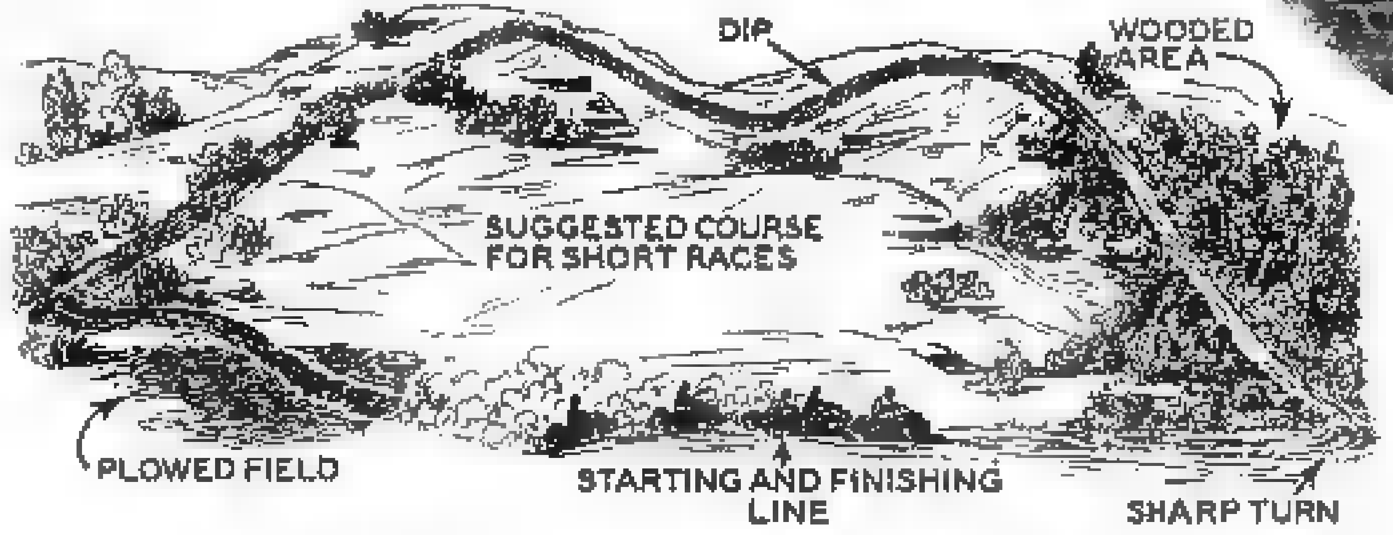
Having stripped his machine of everything save the bare essentials, this rider [redacted] for the start of a Tourist Trophy race. Motors are started after flag has been dropped.

Breath-taking leaps of 50 feet and more [redacted] made on one of the prepared jumps of the T. T. track. This rider takes a stock machine over [redacted] hurdle for a 25-foot jump. Small tracks provide numerous big thrills.

Here is another view of [redacted] motorcycle stripped down for some fast work on the T. T. track. Right, above—Taking the turns on a well planned course. As the riders plunge over the steep embankment, they [redacted] confronted with a sharp turn to the left and another steep hill. Such riding requires skill.

Packing Thrills in a Motorcycle *T. T. Track*

by WALTER E. BURTON



Above—Loose rocks and gravel are purposely left [redacted] the track [redacted] further test of the skill of the rough-riders. Left—This proposed course, patterned after the Massillon, Ohio, T. T. track, packs as many thrills in its half-mile length [redacted] most cross-country tracks. Notice the jump into the plowed field near end of course.

ONE of America's newest and most exciting sports is misnamed: there should be an "N" between the initials of T. T. racing, for there are few forms of excitement that contain more high-explosive qualities than this motorcycle pastime.

A T. T. race is an American, and usually a miniature, version of the famous Tourist Trophy races held yearly on the Isle of Man. It is a motorcycle contest packed with thrills, spills, dust, speed, breath-taking moments and a lot of fun for everyone concerned. It looks like an elaborate and noisy way of committing suicide; but surprisingly few bones have been broken in such competitions. In fact, women riders frequently tackle the milder parts of [redacted] T. T. course.

Let's accompany the Ohio Ramblers on [redacted] Sunday afternoon visit to their T. T. track, which is scarcely a year old. The Ohio Ramblers is a motorcycle club, made up of riders who live in and near the city of Massillon.

The Ramblers' track is, so the club members claim, one of the most perfect in the state, if not in the country. It is the result of [redacted] long and careful search for just the right kind of land. An outstanding feature is that spectators can stand on top of any one of several neighboring hills and view the entire course. There are no large trees in the area, only a few shrubs—mostly bushes bearing long, sharp thorns which riders have learned to respect.

This being merely an informal practice run, the machines are standard in design and equipment. For actual racing, special stripped motorcycles generally are used. All of the riders wear leather crash helmets as a matter of protection.

The starter drops the white flag. The motors, which had been dead, leap into action, and in a flash the sextet is roaring around the first turn. This is [redacted] very mild turn, being only a right-angle one, partly banked. Hardly have the machines straightened out when the leading one strikes the first of a series of hairpin curves. Some of these curves are tilted at dizzy angles on the side of a hill. Now the skidding cycles have negotiated them safely, executing in the process a few dizzy and dust-raising fish tails, and are headed down a short but steep bank preparatory to making a sharp right-hand turn and climbing to the top of the steepest and tallest hill on the course.

When the dust clears away, [redacted] rider is seen struggling to his feet. His machine is lying on its side a yard away.

The five remaining machines, after engaging in a short but lively hill-climbing contest, have reached the high point of the course, and have idled down for the next test. This is a descent of a rocky, loose-dirt hillside that would make [redacted] mule pause and consider. But the motorcycle roughriders do not hesitate. Down the hill they slide, and skid around the sharp turn at the bottom, showering the surrounding bushes and [redacted] few venturesome spectators with dirt. There are two sprawling flops on this bottom turn, but the riders are up in an instant and on their way.

Then come a series of up-and-down waves scrambled with [redacted] few more hairpin turns, and the motorcycles are on the home stretch. There remains one more formidable obstacle. The track has been dug away to produce [redacted] sudden rise of perhaps two feet, over which a rider has to leap in order to complete the run. Because stock machines are being used the cyclist hop this miniature cliff with considerable caution, flying through the air perhaps only 10 or 15 feet. However, in actual competitions, when stripped machines are being used, riders sometimes make broad jumps of 60 feet, and clear the ground by 4 or 5 feet.

And that, in brief, is what a run over a T. T. course is like. For the most part, the machines travel in low gear, although on some

[*Continued on page* 126]

Plans for "LITTLE BEAR" a "MOTH" Class RACER

by
MERRITT GREEN

TO HOLD the tiller of a sensitive racing yacht, is now a thrill to be had by anybody who builds a Moth boat according to the accompanying plans. It is the smallest sailing yacht with an International Racing Association.

As five of these inexpensive little craft form a divisional fleet, it is an easy matter to have sailing races on almost any lake or river in the country, and at the same time have a boat for use in state, national and international regattas.

The Moth described in this article, which can be built with ordinary tools, was designed by Captain Joel Van Sant, originator of the Moth Class. It is specifically known as the Potomac River model and is quite fast. With watertight bulkheads at Stations No. 2 and No. 5 it is unsinkable and, although of the scow, or skimming dish type, its lines are graceful and pleasing.

An experienced boat builder only needs to glance at Figures 1 and 2 to build the hull. But certain specifications are necessary for those unfamiliar with this type of craft.

Before going ahead with any of the actual construction work the very first step is to thoroughly study the drawings—particularly those in Figure 2 which give all the necessary dimensions for laying out the full size plans —an essential preliminary in building any boat.

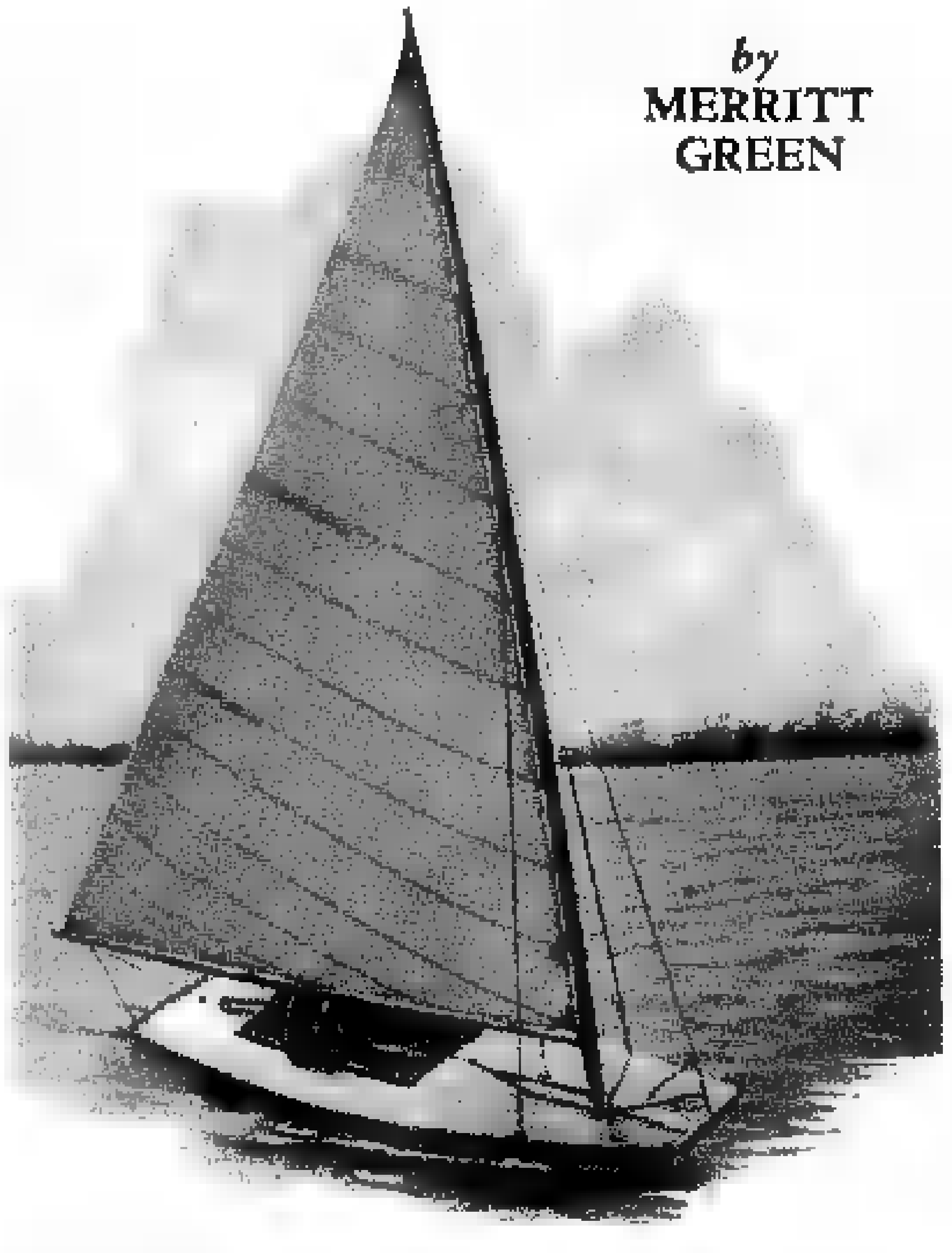
The line dimensions, you will notice, are given as to the *outside* of the planking. Therefore, in laying out the frames, it will be necessary to deduct the thickness of the planking used—in this instance one-half inch at all points involved.

A study of Fig. 4 will clear up this matter for any who find it obscure. In this diagram the lines dimensions at Station No. 3 are given and the limits of the planking indicated.

From your full size drawing you now make paper patterns for the frames and the keel, always remembering to allow for the planking thickness.

Full details of the frame construction are covered in the drawings—particularly clearly in Figures 4, 5 and 6. The bow plate, covered in Fig. 10, is sawed out of a piece of solid white oak. The transom is simply a piece of 1″ white oak or mahogany cut to the angle produced on your full size drawing.

It is best to put the bevels on bow plate, transom and frames after they are set up. The frames are joined with brass screws as shown.



Above photo shows the original Moth as designed by Captain Joel Van Sant in 1930. The Moth type yacht is the smallest sailing craft with an International Racing Association.

With the frames built you can turn your attention to the remaining essential frame member—the keel. The keel is formed from one 12-foot length of fir or yellow pine, 4½ inches wide by ⅝″ thick, and a 12-foot length of ½-inch white oak, 2½ inches wide. The two are firmly screwed together forming the section shown in Fig. 8. Fig. 7 shows the method used to set up the keel. A 12-foot length of 2″x12″, or 14″, planking is sawn out so that the exact curve or line of the keel, fore and aft, remains, the necessary measurements being taken off the plans.

With the keel set up in the mould, or jig, fasten the frames in place using brass screws throughout.

The bow plate and stern transom are next screwed to the keelson and braced firmly with 1¼″ or 1½″ oak knees as shown in the inboard profile drawing, Fig. 1.

With bow plate, transom and all frames in place, temporary braces are secured to the sides to hold the frames rigid while notching them for the chine and the deck clamp. These notches should be ¾″ by 1″ and are clearly indicated in frame detail.

Next fit the chine pieces and the deck clamps, bevelling the frames as needed. Two 9″x12″ planks are then clamped in position, marked off and sawed to shape. These will form the sides of your boat and they may be of white cedar, mahogany or redwood—½″ thick. (Note: Either ⅜″ or ½″ planking is specified but the accompanying drawings show half-inch planking throughout.) Fasten the planks to the frames, deck clamp and chine with brass screws, then loosen the keel former supports and turn the boat over, still leaving it attached to the jig you have employed to shape it.

The frames may now be notched on the under sides for the seam battens, as shown in Fig. 5. The number of planks used on the bottom, of course, determines the number of seam battens, but if you use 8-inch planking as shown, there will be two battens on each side of the frames. The battens, of ½″x2″ spruce are fastened with brass screws.

You are now ready for the bottom planking. This may be either mahogany, cedar or

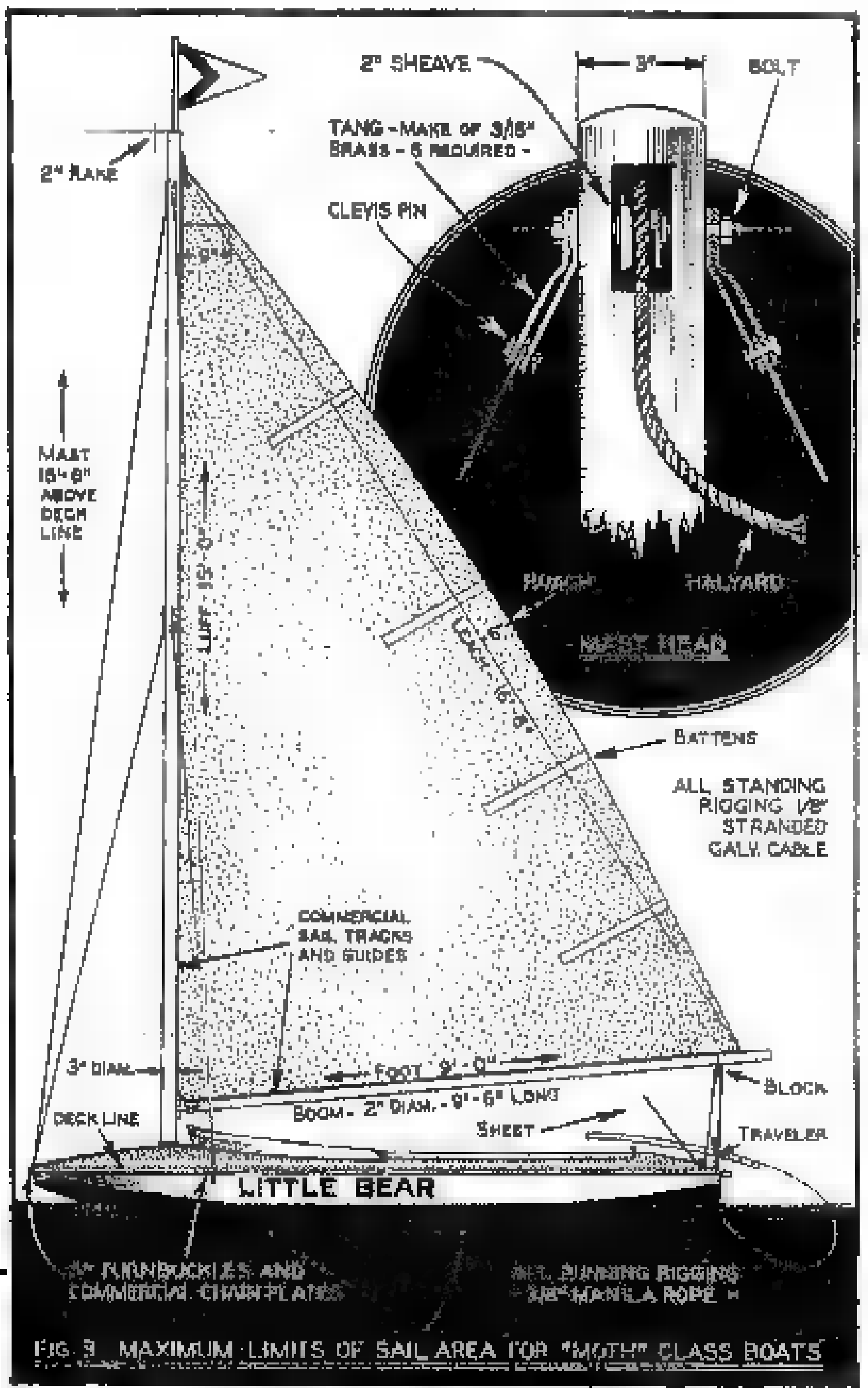

2″ SHEAVE
3″
BOLT
TANG - MAKE OF 3/16″ BRASS - 6 REQUIRED -
CLEVIS PIN
2″ RAKE
MAST 16′-6″ ABOVE DECK LINE
LUFF 15′-0″
LEACH 16′-6″
ROACH
HALYARD
MAST HEAD
BATTENS
ALL STANDING RIGGING 1/8″ STRANDED GALV. CABLE
COMMERCIAL SAIL TRACKS AND GUIDES
3″ DIAM.
FOOT 9′-0″
BOOM - 2″ DIAM. - 9′-6″ LONG
BLOCK
DECK LINE
SHEET
TRAVELER
LITTLE BEAR
1/4″ TURNBUCKLES AND COMMERCIAL CHAINPLATES
ALL RUNNING RIGGING 3/8″ MANILA ROPE

FIG. 3 MAXIMUM LIMITS OF SAIL AREA FOR "MOTH" CLASS BOATS

FIG. 2 – COMPLETE PROFILE AND CROSS-SECTION LINES "LITTLE BEAR"—A MOTH RACER DIMENSIONS ARE TO OUTSIDE OF PLANKING

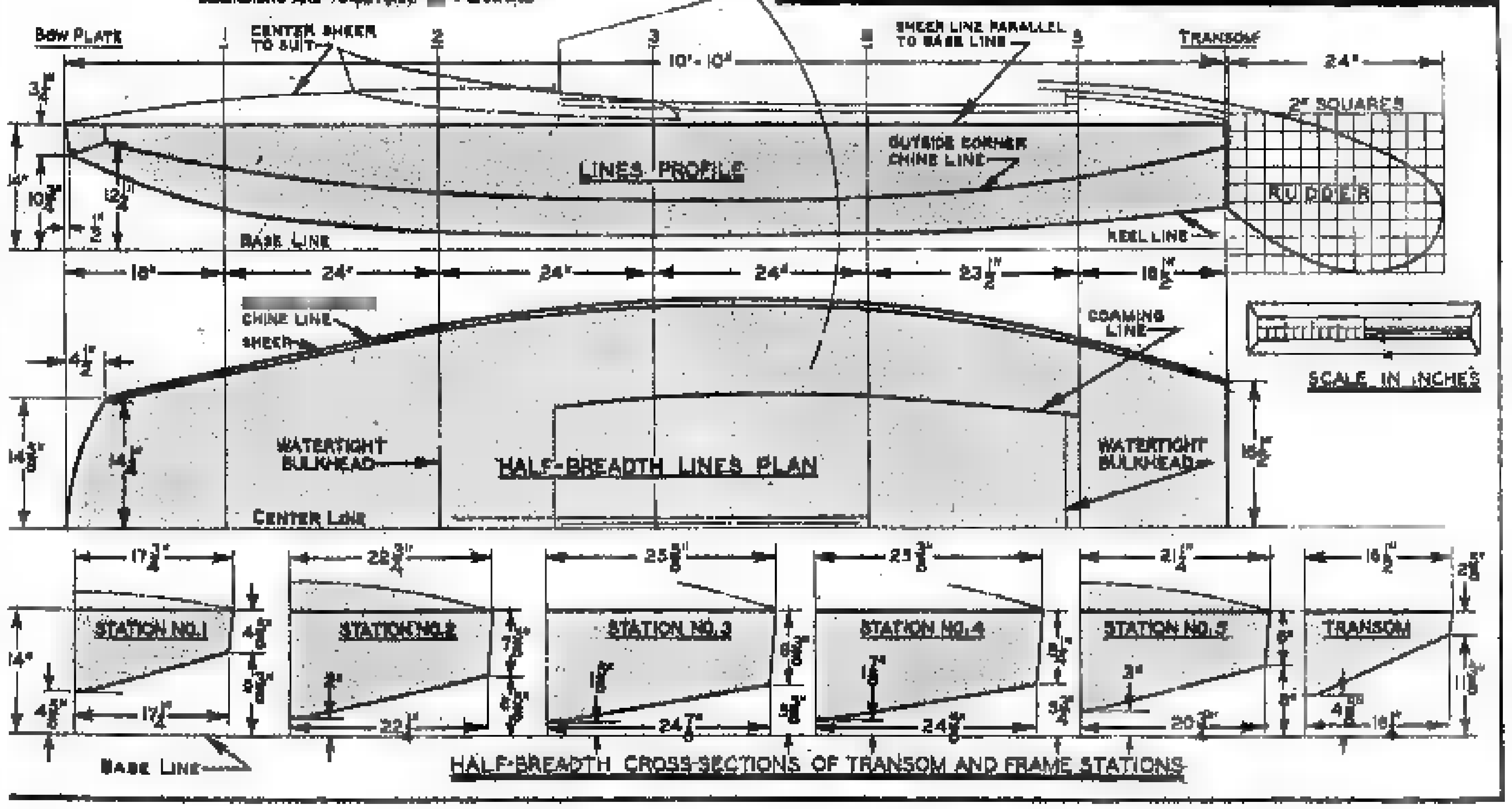

BOW PLATE
1
CENTER SHEER TO SUIT
2
3
4
SHEER LINE PARALLEL TO BASE LINE
5
TRANSOM
10′-10″
24″
2″ SQUARES
LINES PROFILE
OUTSIDE CORNER CHINE LINE
RUDDER
BASE LINE
KEEL LINE
18″
24″
24″
24″
23½″
18½″
CHINE LINE
SHEER
COAMING LINE
SCALE IN INCHES
WATERTIGHT BULKHEAD
HALF-BREADTH LINES PLAN
WATERTIGHT BULKHEAD
CENTER LINE
STATION NO. 1
STATION NO. 2
STATION NO. 3
STATION NO. 4
STATION NO. 5
TRANSOM
BASE LINE
HALF-BREADTH CROSS-SECTIONS OF TRANSOM AND FRAME STATIONS

Fig. 3, above right, is a general view of the completed Moth and rigging. Inset shows the details of mast head. In Fig. 2 note that station dimensions are to outside of planking. See Fig. 4 for construction. Cut rudder to shape shown above. After studying above drawings, lay out plans full size with a 12′ batten. Full size plans supersede any minor deviations.

Centerboard Adjustment Made When in Place

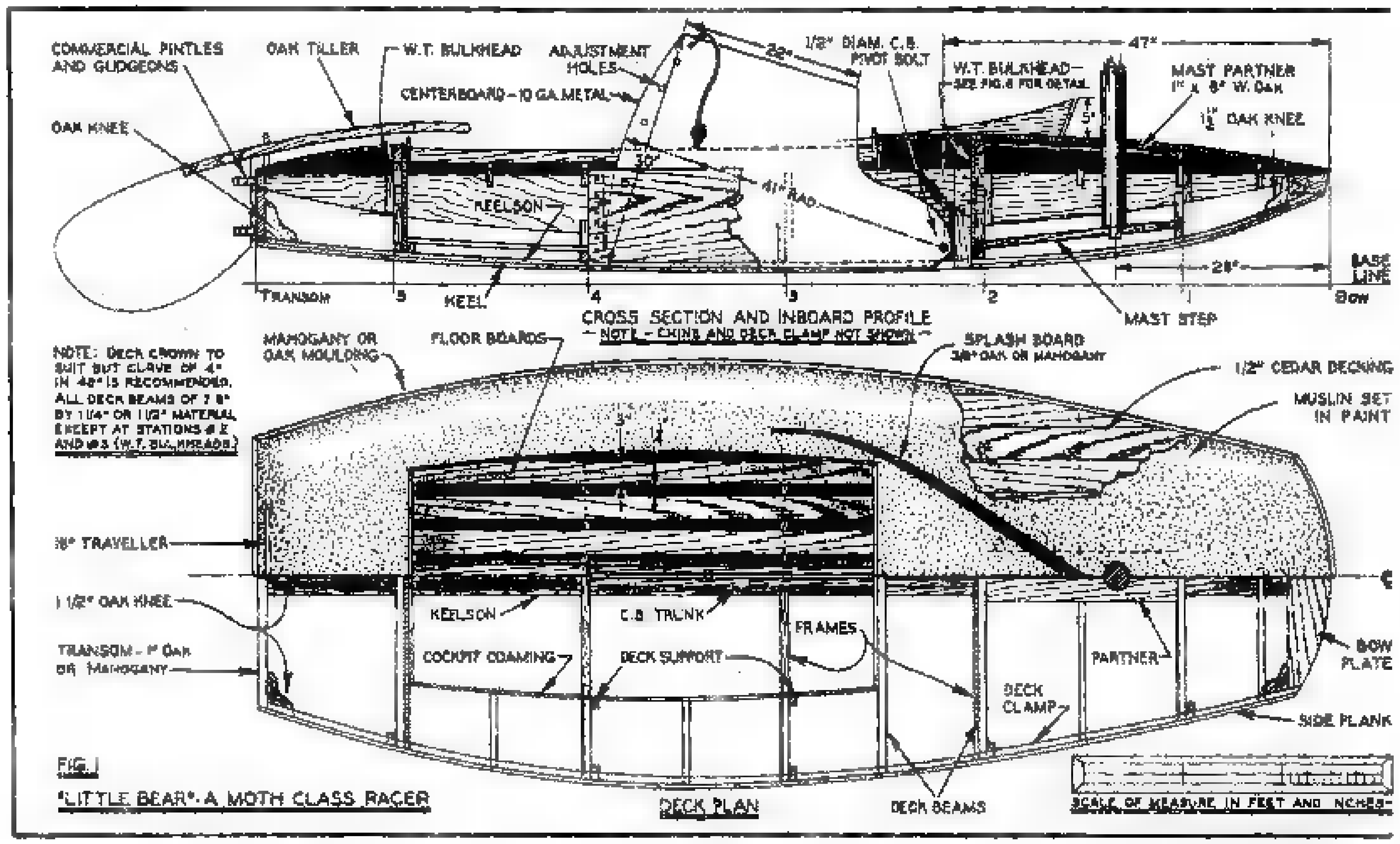

COMMERCIAL PINTLES AND GUDGEONS
OAK TILLER
W.T. BULKHEAD
ADJUSTMENT HOLES
CENTERBOARD – 10 GA. METAL
1/2" DIAM. C.B. PIVOT BOLT
22"
47"
W.T. BULKHEAD – SEE FIG. 6 FOR DETAIL
MAST PARTNER 1" x 8" W. OAK
1½" OAK KNEE
OAK KNEE
KEELSON
30°
41" RAD.
5"
28"
BASE LINE
TRANSOM
5
KEEL
4
3
2
1
Bow
MAST STEP
CROSS SECTION AND INBOARD PROFILE
– NOTE – CHINE AND DECK CLAMP NOT SHOWN –
NOTE: DECK CROWN TO SUIT BUT CLAVE OF 4" IN 48" IS RECOMMENDED. ALL DECK BEAMS OF 7/8" BY 1¼" OR 1½" MATERIAL EXCEPT AT STATIONS #2 AND #5 (W.T. BULKHEADS)
MAHOGANY OR OAK MOULDING
FLOOR BOARDS
SPLASH BOARD 3/8" OAK OR MAHOGANY
1/2" CEDAR DECKING
MUSLIN SET IN PAINT
3/8" TRAVELLER
1 1/2" OAK KNEE
TRANSOM – 1" OAK OR MAHOGANY
KEELSON
C.B. TRUNK
COCKPIT COAMING
DECK SUPPORT
FRAMES
DECK CLAMP
PARTNER
BOW PLATE
SIDE PLANK
DECK PLAN
DECK BEAMS
SCALE OF MEASURE IN FEET AND INCHES

FIG. 1

"LITTLE BEAR"- A MOTH CLASS RACER

Above—Note shape and dimensions of centerboard in the cross-section drawing. The centerboard trunk is fitted between stations 2 and 4. Watertight bulkheads are at stations 2 and 5. For the bottom planking, either ½-inch cedar, mahogany, or redwood may be used. The garboard strake (next to keel) must always be the first plank to be fitted.

redwood, ½″ thick. The garboard strake, or plank nearest the keel, is fitted first. Plane off the shoulder of the keel to conform to the frame sides and coat it with thick paint or marine glue. The batten is similarly treated. Then screw the garboard strake securely to the bow plate, to each of the frames and to the stern transom. Put some good screw fastenings along the edge of the keelson as well, and then use copper clinch nails or rivets, spaced about 2″ apart, to secure the plank to the seam batten.

The jig or former, may now be removed from the keel. Take out the screws and plug the holes tight. Then rip the centerboard slot. This slot should be ½″ wide and its size and location can be taken off the drawings, Fig. 1.

Fig. 9, in conjunction with the inboard profile drawing, Fig. 1, explains the simple construction and fitting of the centerboard trunk. The trunk is fastened to the keelson by 3″ brass screws *driven up through the keel. Do not drill the hole for the centerboard adjustment until later when you have the centerboard in place.* With the centerboard trunk in place the next step in order is to make the deck beams. These may be crowned, or rounded, to suit individual ideas but a four-inch in four feet curve is recommended. Make a master mould and saw or steam bend all the deck beams to this mould or jig, establishing the widths required from the positions shown in the deck plan. The deck beams themselves may be of ⅞″ by 1¼″ or 1½″ oak, or you may use a lighter material. The beams at the watertight stations however should be in all cases 1″x1½″ material as shown in Fig. 6.

The deck beams are screwed in place at all frame stations and also where shown in the deck plan, Fig. 1.

Where the cockpit occurs, *put in full beams,* sawing out later after decking. One thing remains before laying the deck. This is the installation of the mast step and partner.

The decking, of ½″ cedar, is secured to the deck beams with well countersunk finishing nails. It is laid fore and aft—the same as the bottom planking—and you will find that four-inch planks are the best.

With the deck nailed down and the nail holes filled with white lead, plane and sand the entire deck down until it is perfectly smooth. Then cover with heavy paint or marine glue and stretch muslin smoothly over the entire surface, bringing the edges down over the side planks about one inch

Mast, Boom Must Not Exceed Three Inch Diameter

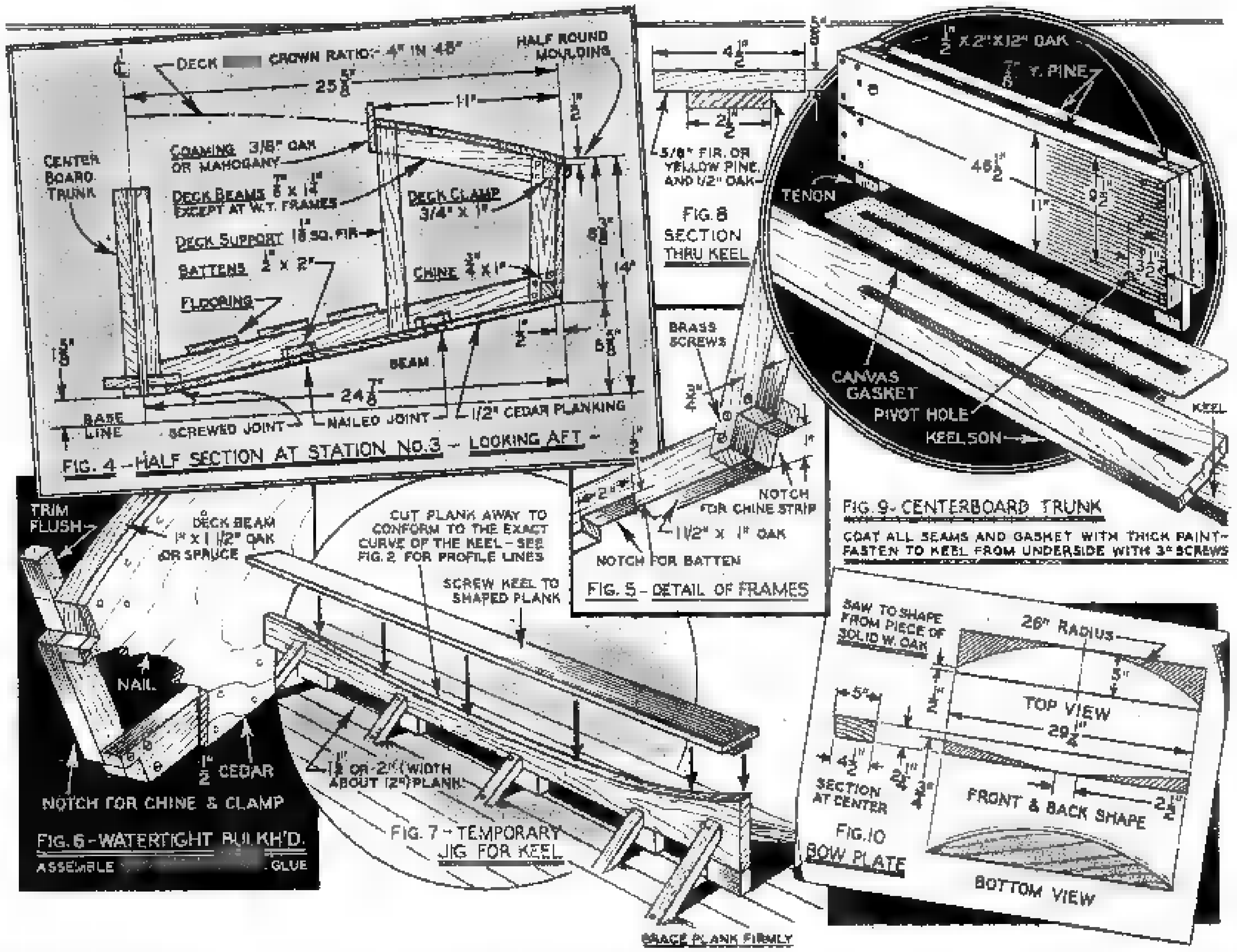

DECK CROWN RATIO:- 4" IN 48"
HALF ROUND MOULDING
25⅝"
11"
½"
CENTER BOARD TRUNK
COAMING 3/8" OAK OR MAHOGANY
DECK BEAMS ⅞" x 1¼" EXCEPT AT W.T. FRAMES
DECK CLAMP 3/4" x 1"
DECK SUPPORT 1⅛" SQ. FIR
BATTENS ½" x 2"
CHINE ¾" x 1"
FLOORING
6¾"
14"
6⅝"
1⅝"
BEAM
24⅞"
BASE LINE
SCREWED JOINT
NAILED JOINT
1/2" CEDAR PLANKING
4½"
2½"
5/8" FIR, OR YELLOW PINE, AND 1/2" OAK
BRASS SCREWS
4¾"
2"
1"
NOTCH FOR CHINE STRIP
1 1/2" x 1" OAK
NOTCH FOR BATTEN
½" x 2" x 12" OAK
⅞" Y. PINE
46½"
11"
9½"
TENON
CANVAS GASKET
PIVOT HOLE
KEELSON
KEEL
COAT ALL SEAMS AND GASKET WITH THICK PAINT- FASTEN TO KEEL FROM UNDERSIDE WITH 3" SCREWS
TRIM FLUSH
DECK BEAM 1" x 1 1/2" OAK OR SPRUCE
NAIL
½" CEDAR
NOTCH FOR CHINE & CLAMP
ASSEMBLE GLUE
CUT PLANK AWAY TO CONFORM TO THE EXACT CURVE OF THE KEEL – SEE FIG. 2 FOR PROFILE LINES
SCREW KEEL TO SHAPED PLANK
1½ OR 2" (WIDTH ABOUT 12") PLANK
BRACE PLANK FIRMLY
SAW TO SHAPE FROM PIECE OF SOLID W. OAK
26" RADIUS
5"
TOP VIEW
29¼"
4½"
2¼"
¾"
SECTION AT CENTER
FRONT & BACK SHAPE
2½"
BOTTOM VIEW

FIG. 4 – HALF SECTION AT STATION No. 3 – LOOKING AFT –

FIG. 8 SECTION THRU KEEL

FIG. 9 - CENTERBOARD TRUNK

FIG. 5 - DETAIL OF FRAMES

FIG. 6 - WATERTIGHT BULKH'D.

FIG. 7 - TEMPORARY JIG FOR KEEL

FIG. 10 BOW PLATE

Figures 4 to 10 show some of the finer details of construction. In laying the keel (Fig. 7) the member is firmly screwed into the mould of the cut-out plank to be released after the frame is built up to a point where it will hold in shape.

before tacking muslin down permanently. At this stage the hull should be painted with a good coat of white lead and oil.

The rudder explained in the drawings may be either of one-inch oak or 10-gauge metal. The spars are planed round with a uniform dimension. The "Moth" class boat does not permit mast or boom to exceed 3″ in diameter. Actually a 3″ diameter mast and a 2″ boom will be found to achieve average requirements. A ⅝″ sail track is put along top of the boom and on the after side of mast.

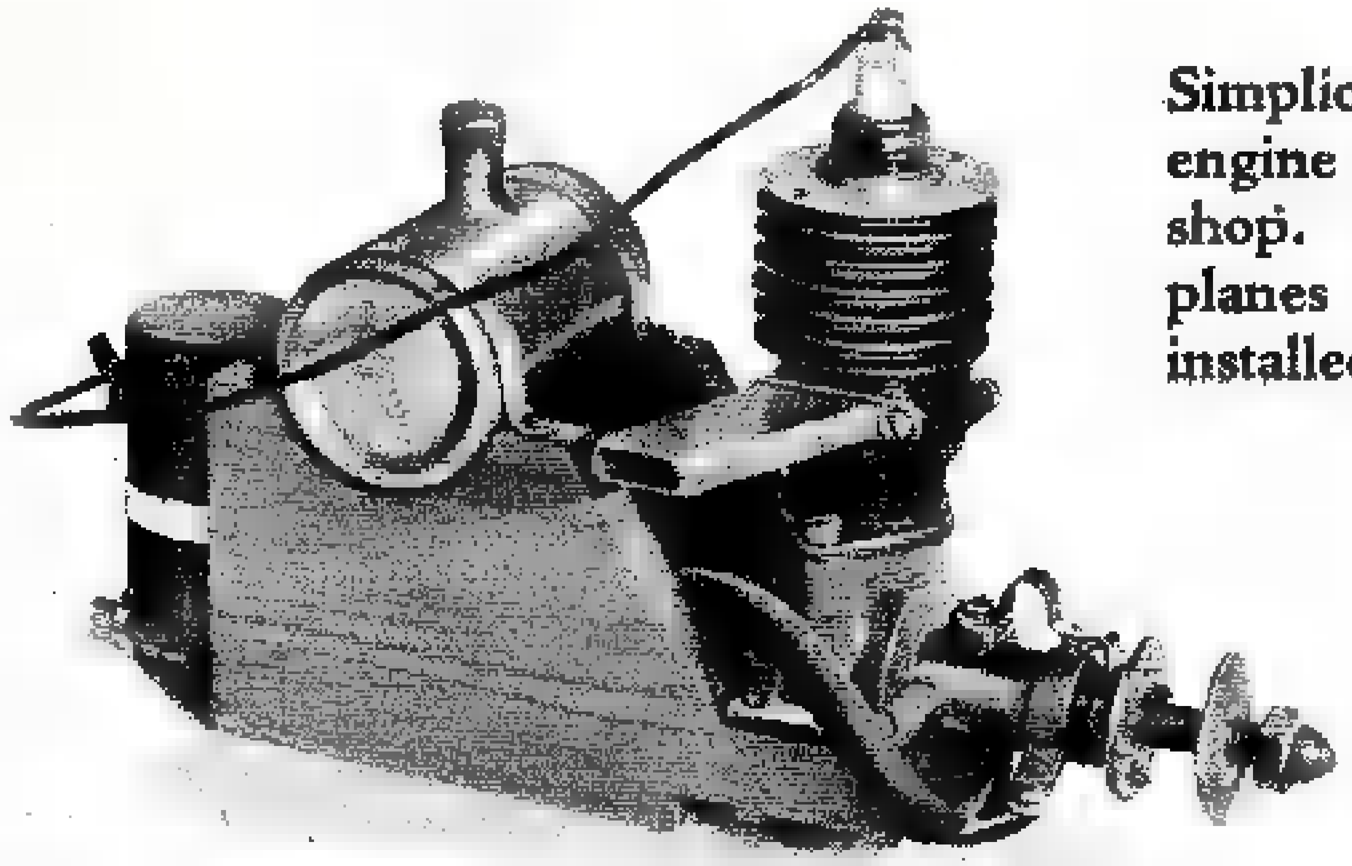
The sail shown in the drawings, Fig. 3, is the largest permitted in the class.

The metal fittings are few and simple. It is recommended that all of them be obtained from commercial sources. The chain plates are attached to the side planks and to the prow. Five-inch turnbuckles are large enough for the standing rigging which is regular ⅛″ stranded galvanized cable. The running rigging is of ⅜″ manila. The peak halyard, is run through the sheave shown in the detail sketch on Fig. 5 to a check block on the mast. A traveler is needed for the sheet as also one or two small blocks. The flooring, which is of ½″ cypress, is laid lengthwise as shown.

The cockpit coaming should be ⅜″ mahogany or oak; splash boards are of the same material. The final touch is to put on the moulding which is half round mahogany or oak and is laid along the edge of the deck covering the tacks which hold the muslin covering.

OTHER BOAT PLANS AND PROJECTS
Plans for building 20 kinds of water craft from rowboats to motor cruisers are fully described in the new HOW TO BUILD 20 BOATS book, available at 50c, postpaid. More than 35 boats are described in MM's free blueprint catalog. Blueprints of LITTLE BEAR greatly enlarged and printed on durable blueprint paper can be secured at $1.50 per set. Order from: Modern Mechanix Publishing Co., Greenwich, Conn.

"Chinook" A MIDGET GAS ENGINE FOR YOUR MODEL



This is *Chinook* completely assembled with gasoline tank and spark coil in place. Shaft is fitted to take a propeller 13 inches long on a model airplane.

Simplicity of construction makes this engine an ideal project for the home shop. It [illegible] be used on four-foot model planes [illegible] with [illegible] water jacket can be installed easily in midget power boats.

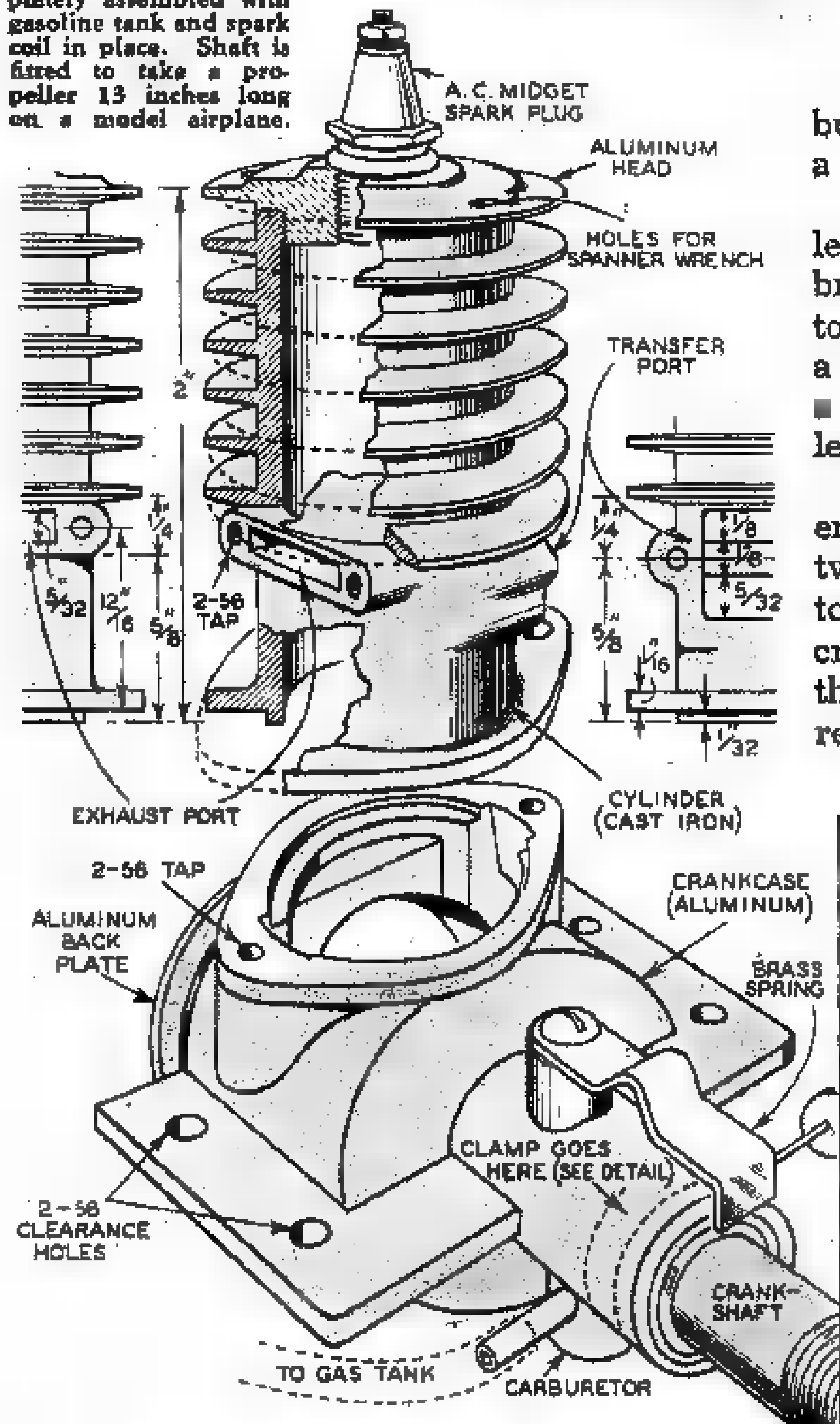
by WESTON FARMER

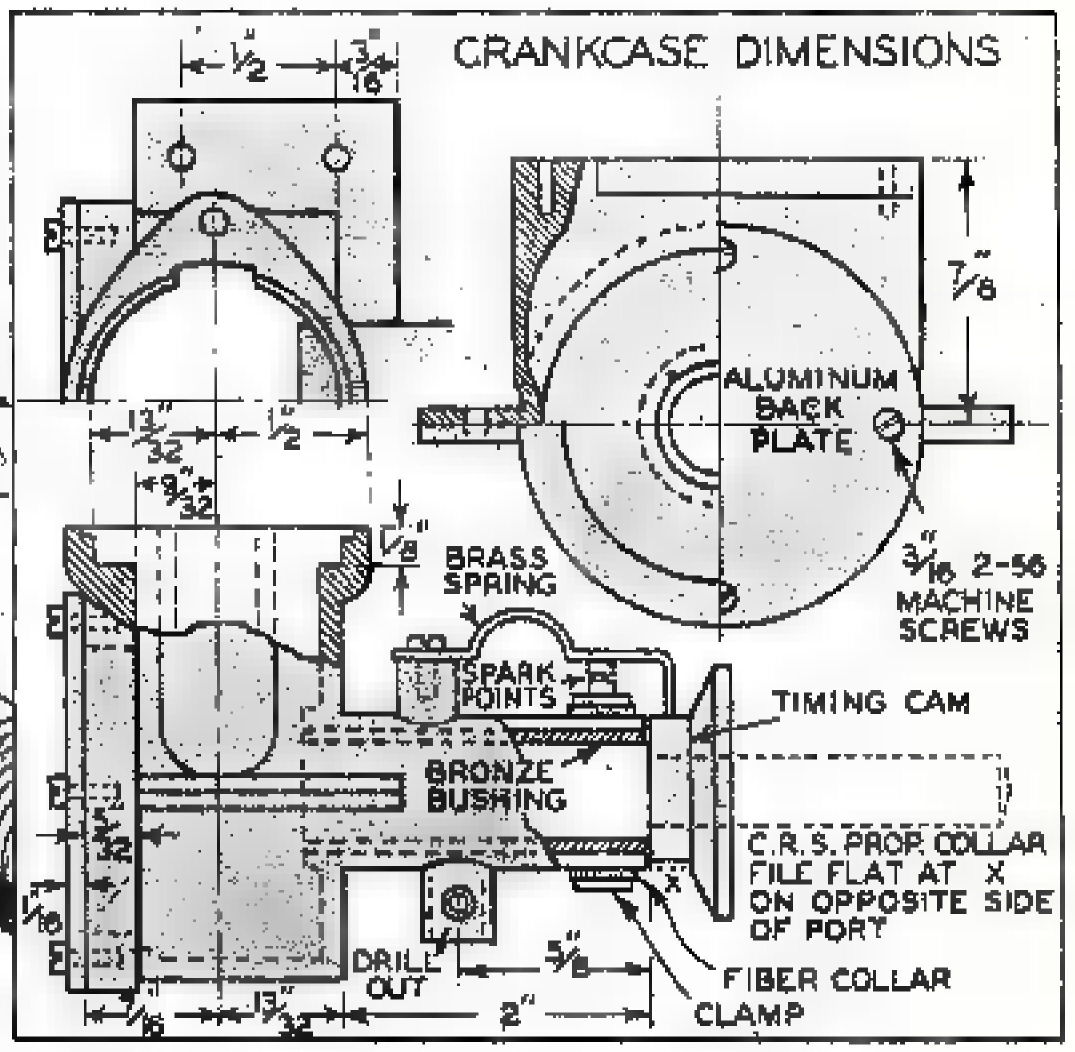
THE *Chinook* is so named for the hot dry winds that sweep across the middle west during the summer time. It will provide such a breeze for the running of any small 4′ model plane or enough power for [illegible] model boat. It can be built by anyone who has access to [illegible] lathe and a drill press.

It may also be built as a marine engine, by leaving off the cooling fins and pressing on a brass barrel between the top and bottom fins to serve as [illegible] water jacket. Provided thus with a three-inch flywheel, it will reliably power [illegible] small model boat of 24 to 30 inches overall length.

The operating principles of this little gas engine are explained in the sketches. It is a two-cycle engine. As the piston nears the top of the stroke, a vacuum is formed in the crankcase. This vacuum draws gas through the hollow crankshaft from the simple carburetor, or mixing valve, on the under side of the shaft housing. The spark explosion sends the piston down. At the bottom of the stroke a transfer port on one side and the exhaust port on the other side of the cylinder are opened. The burnt gases escape, while the fresh gas in the crankcase is forced through [illegible] slot in the piston wall through the transfer port into the cylinder.

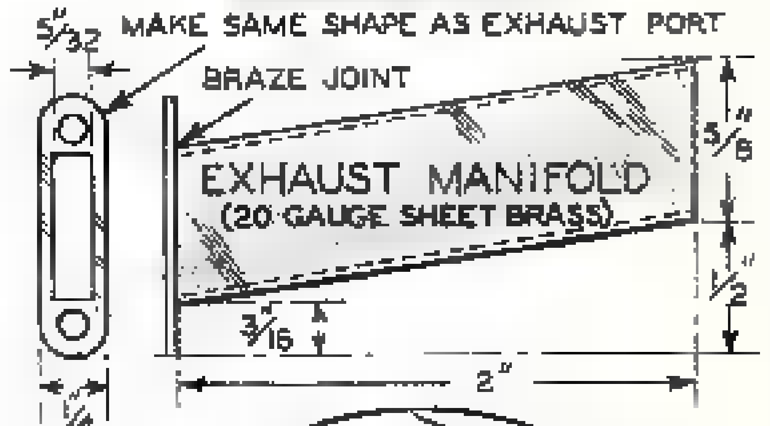
The crankcase on a two cycle engine is the most important part. In *Chinook*, the drawings show the proper dimensions for an aluminum crankcase which is intended to be cast. If you do not have a foundry handy, it can be turned and milled from the solid, with minor variations. In preparing the pattern for the casting do not bother with shrink rule. The pattern is too small to be affected by shrinkage. Make a split pattern, using generous core prints, and the result should be a smooth casting. Chuck the piece in the lathe, face off the rear end, then drill a 3/8″ hole through the bearing boss. Into this is pressed a drive fit

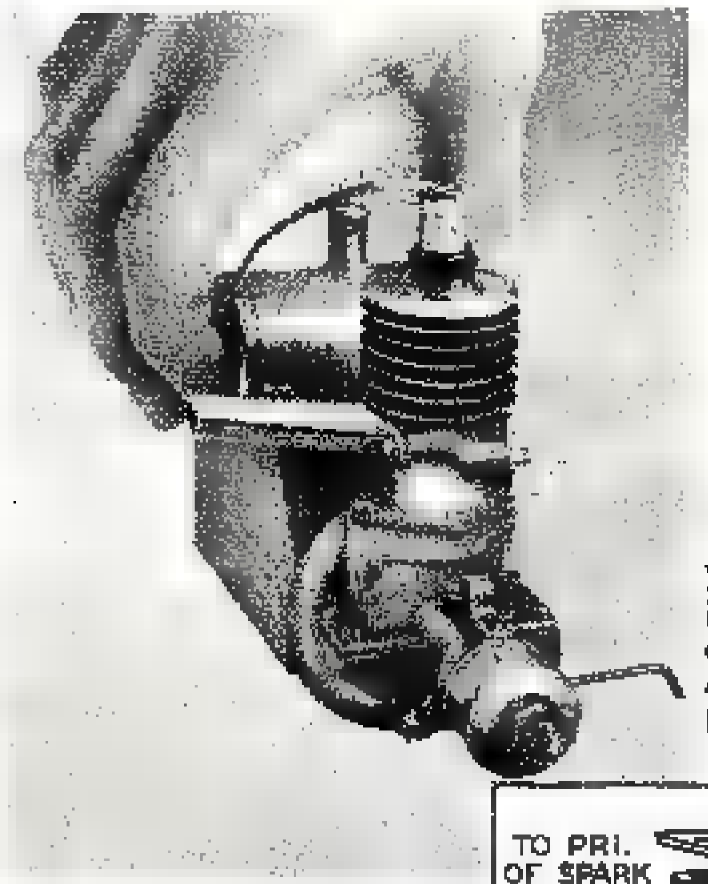

A.C. MIDGET SPARK PLUG
ALUMINUM HEAD
HOLES FOR SPANNER WRENCH
TRANSFER PORT
2″
1/4″
5/32
12/16″
5/8″
2-56 TAP
1/4″
1/8
1/8
5/32
5/8″
1/16″
1/32″
EXHAUST PORT
CYLINDER (CAST IRON)
2-56 TAP
ALUMINUM BACK PLATE
CRANKCASE (ALUMINUM)
BRASS SPRING
CLAMP GOES HERE (SEE DETAIL)
2-56 CLEARANCE HOLES
CRANKSHAFT
TO GAS TANK
CARBURETOR

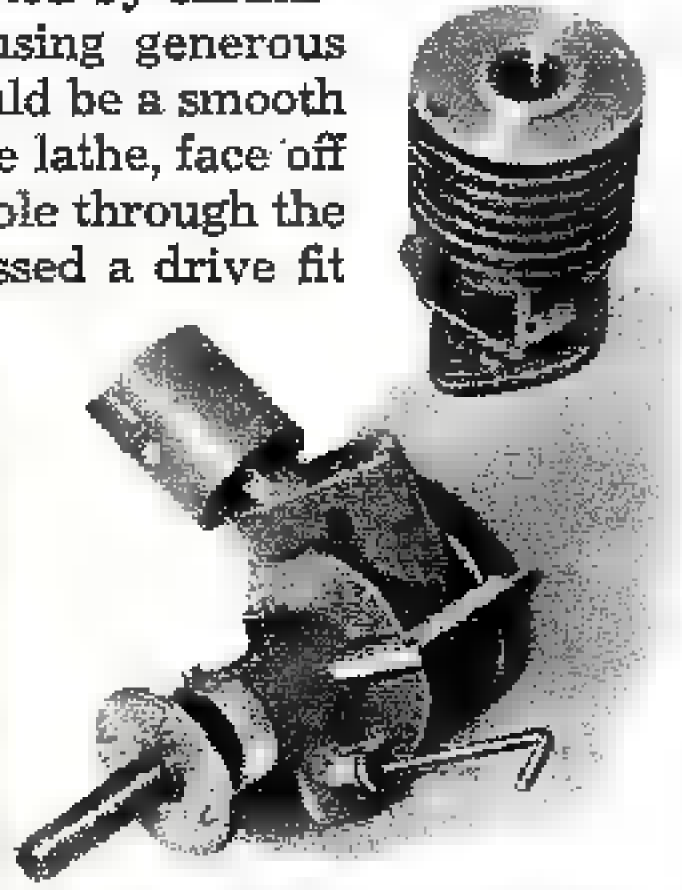

CRANKCASE DIMENSIONS
1/2″
3/16″
7/8″
13/32″
1/2″
9/32″
1/8″
ALUMINUM BACK PLATE
BRASS SPRING
3/16″ 2-56 MACHINE SCREWS
SPARK POINTS
TIMING CAM
BRONZE BUSHING
5/32
1/16″
C.R.S. PROP. COLLAR FILE FLAT AT X ON OPPOSITE SIDE OF PORT
X
DRILL OUT
5/8″
FIBER COLLAR
CLAMP
1/16″
13/32″
2″

Drawings above and at right show assembly and dimensions of crankcase and cylinder. Both are castings, but can be turned from solid by cutting various projections separately to shape and brazing whole together.

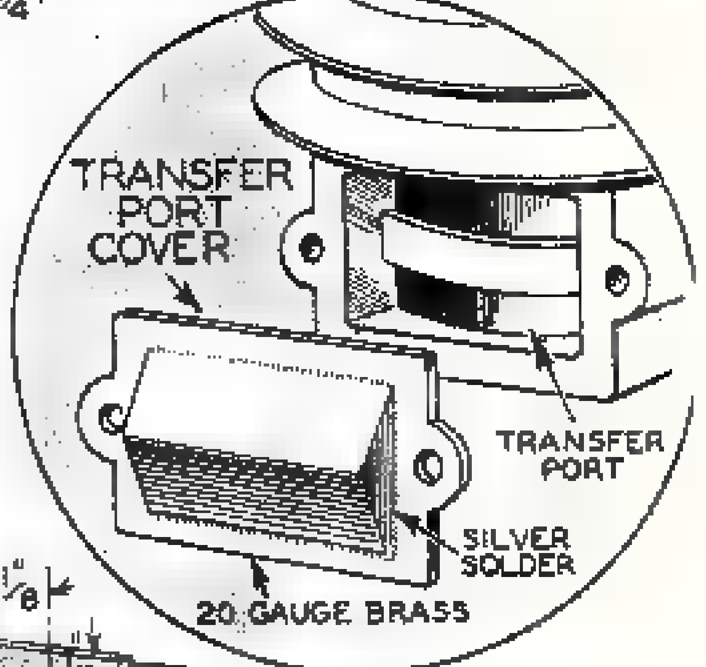
This Fairchild model plane is powered with a *Chinook* engine. Motor weighs only 12 oz. complete.

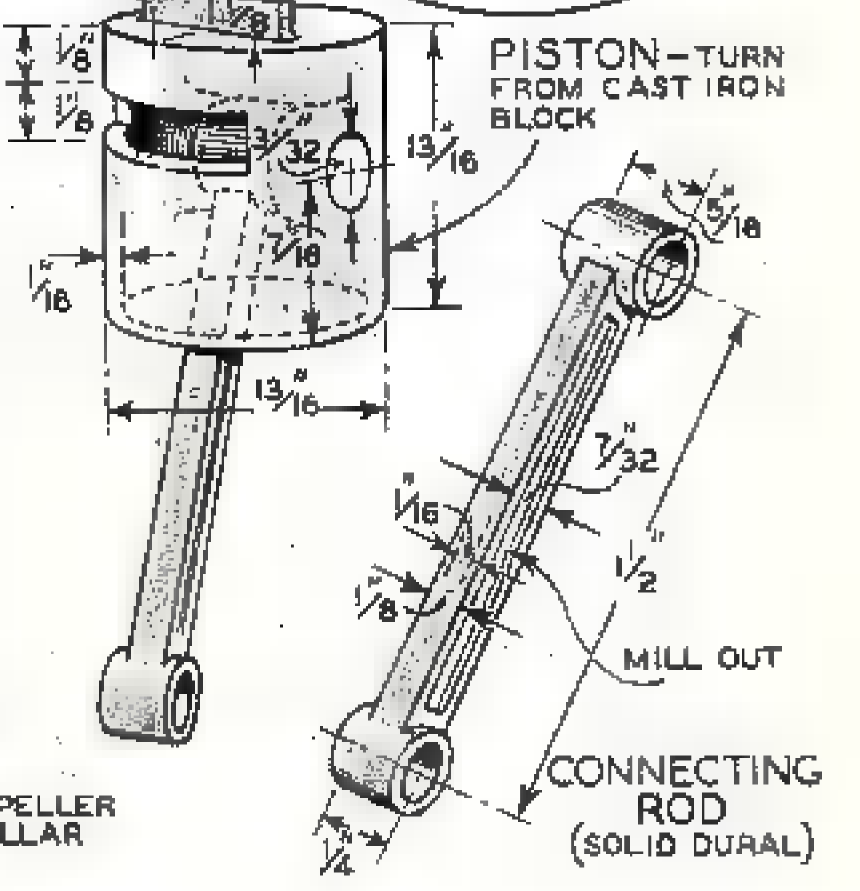

5/32
MAKE SAME SHAPE AS EXHAUST PORT
BRAZE JOINT
EXHAUST MANIFOLD (20 GAUGE SHEET BRASS)
3/8″
1/2″
3/16
2″
1/4



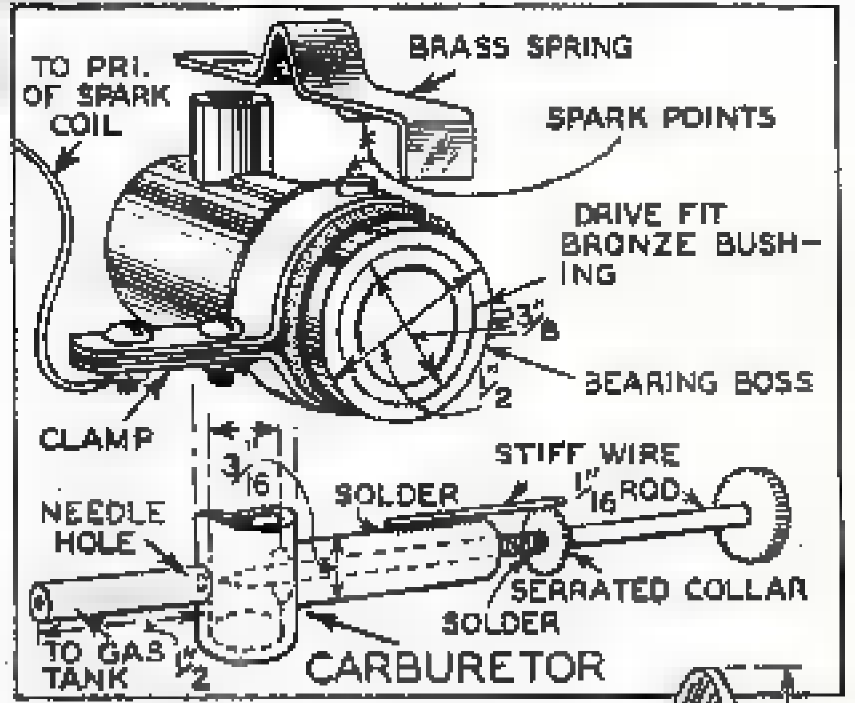


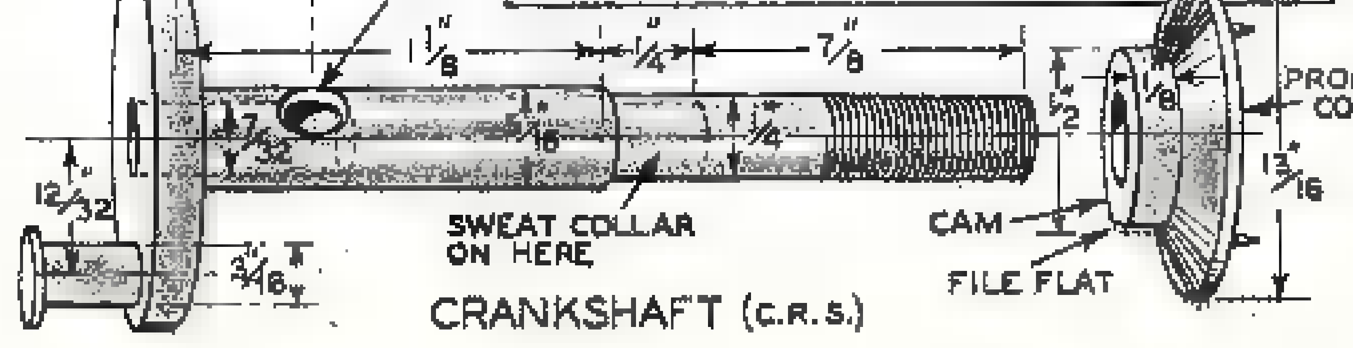
Left—Front view of motor. Original model had bent rod instead of knurled knob [illegible] carburetor. Above—Cylinder removed, showing piston and connecting rod of engine.


TRANSFER PORT COVER
TRANSFER PORT
SILVER SOLDER
20 GAUGE BRASS


BAFFLE PLATE
1/8″
1/8″
1/8″
PISTON—TURN FROM CAST IRON BLOCK
3/32
13/16
7/16
1/16″
13/16″
5/16
7/32
1/16
1/2
1/8
MILL OUT
CONNECTING ROD (SOLID DURAL)
1/4″

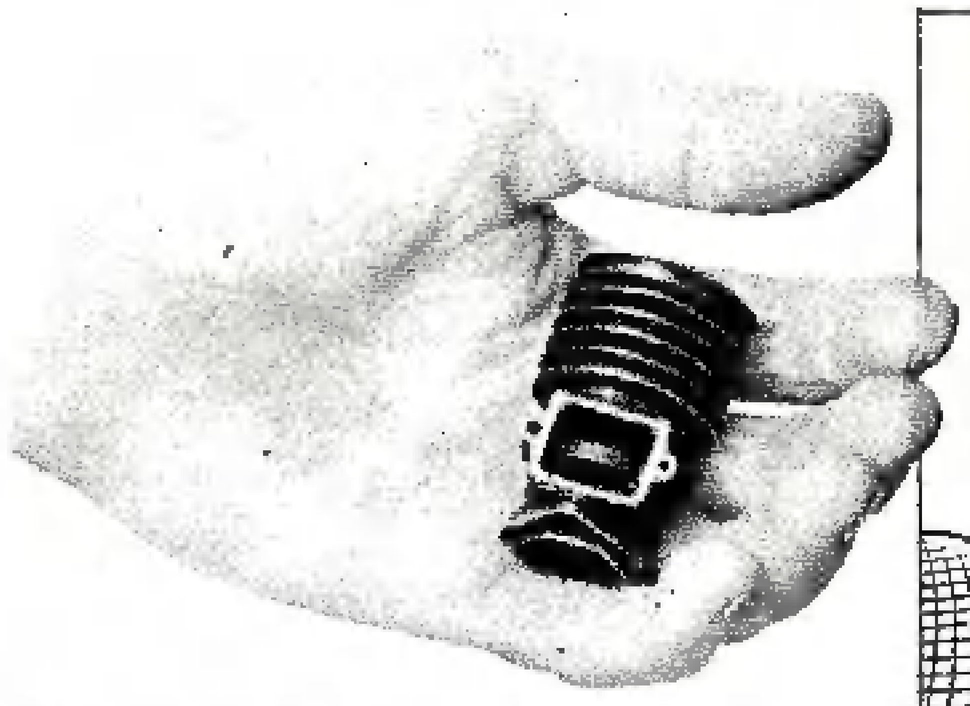
Right—Carburetor is simply mixing valve. Air, sucked through 3/16″ hole, mixes with gas from needle hole. Timer is brass spring resting on cam and brass clamp. Below — Crankshaft assembly. Intake hole traps gas from carburetor, passes it [illegible] crankcase.

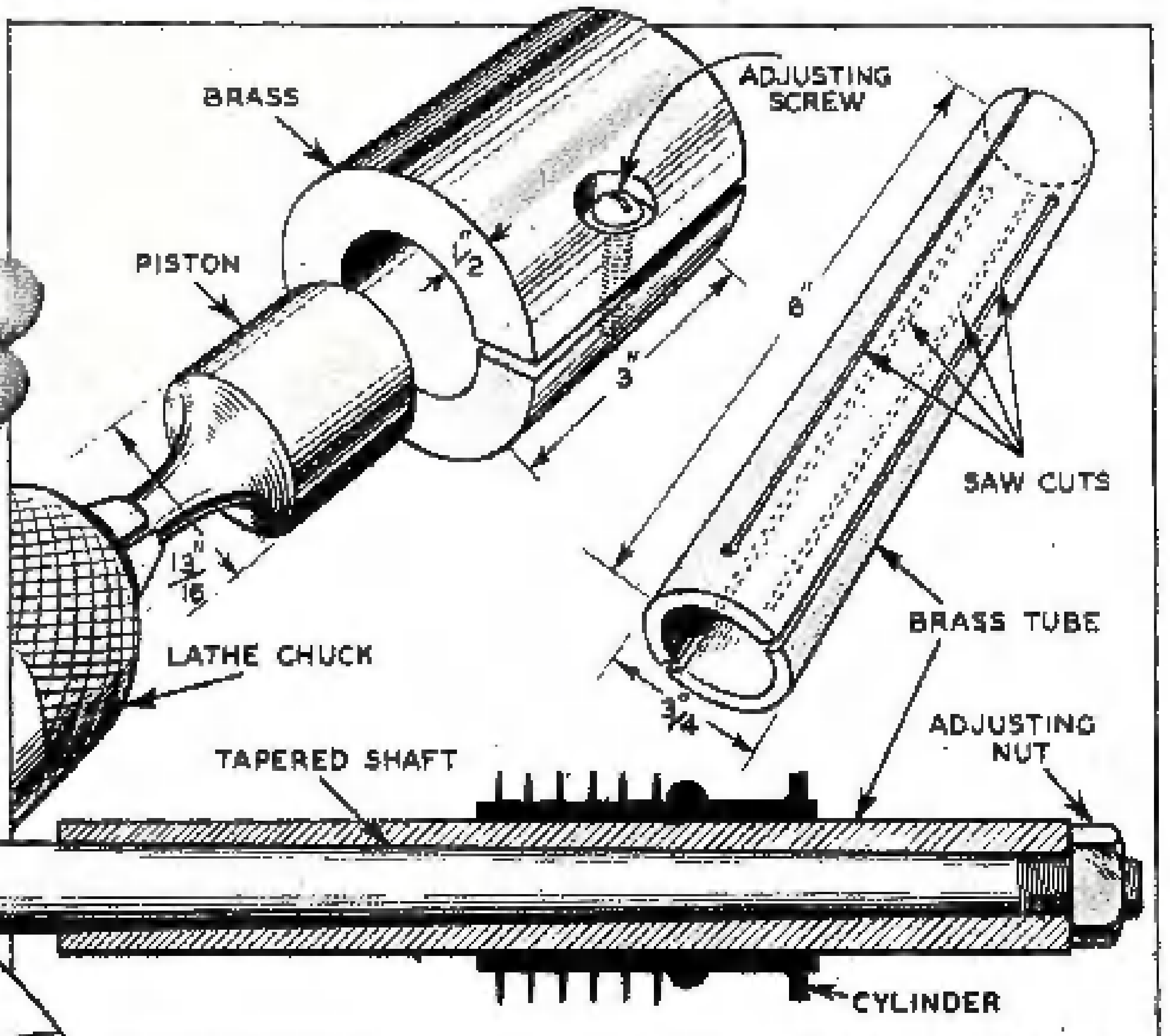

TO PRI. OF SPARK COIL
BRASS SPRING
SPARK POINTS
DRIVE FIT BRONZE BUSHING
3/8″
1/2″
BEARING BOSS
CLAMP
3/16″
STIFF WIRE
1/16″ ROD
SOLDER
NEEDLE HOLE
SERRATED COLLAR
SOLDER
TO GAS TANK
1/2″
CARBURETOR


1/8″
3/8″
INTAKE 3/16″ HOLE
1 1/8″
1/4″
7/8″
7/32
1/16″
1/4″
1/2″
1/8″
PROPELLER COLLAR
12/32″
3/16″
SWEAT COLLAR ON HERE
CAM
FILE FLAT
13/16″
CRANKSHAFT (C.R.S.)

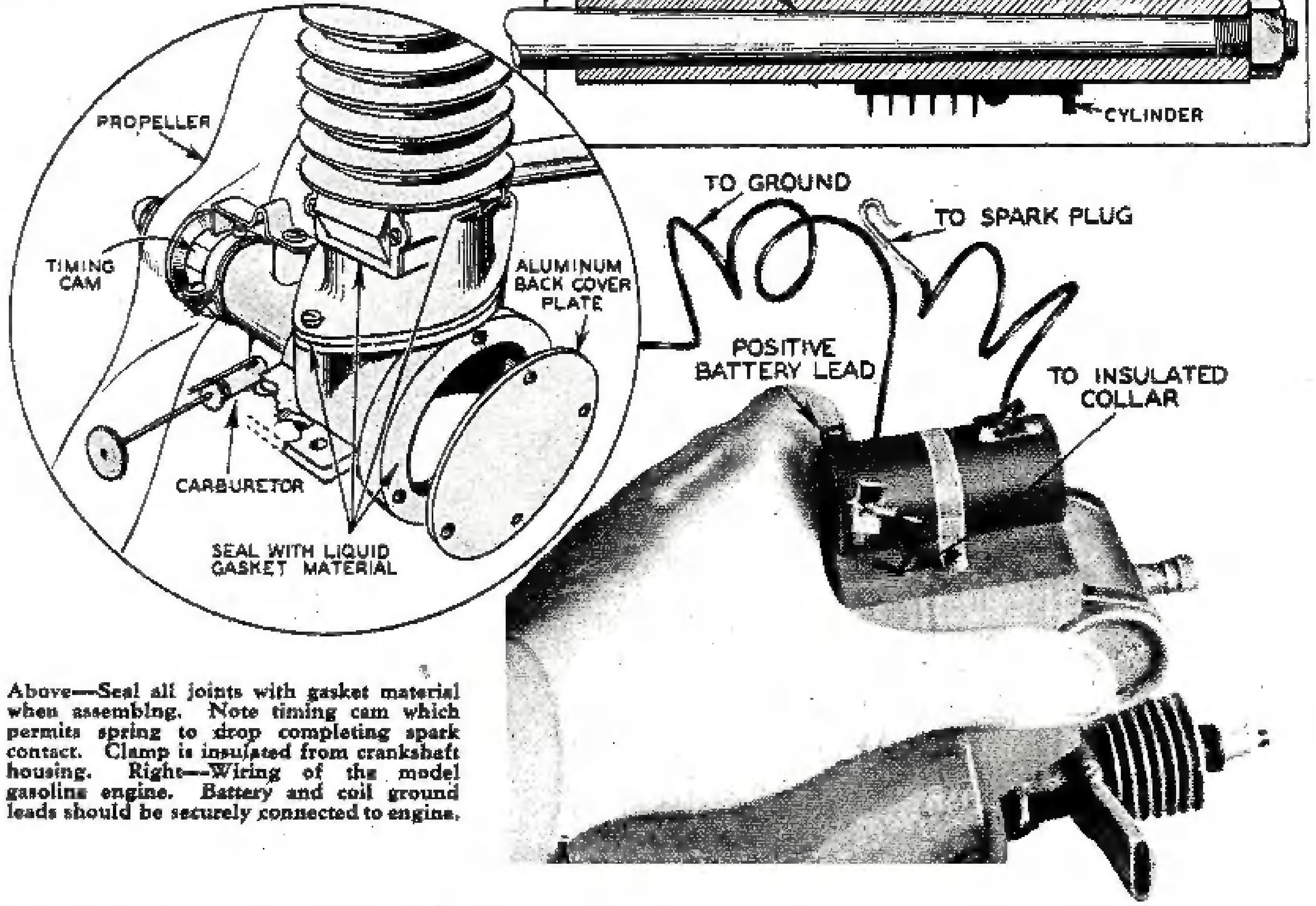
At top—Exhaust manifold and transfer port cover are cut from sheet brass and soldered [illegible] brazed. Rib in transfer port may be omitted though it improves efficiency of motor. Slot [illegible] piston allows gas to pass from crankcase to port.

Lapping Method Insures Smooth Running Engine



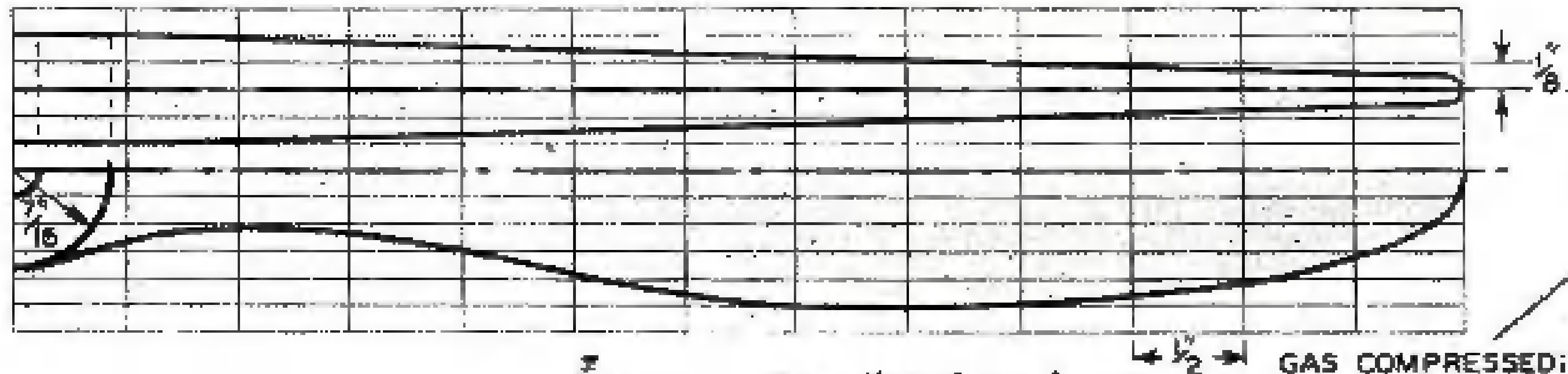

BRASS
ADJUSTING SCREW
PISTON
½″
8″
3″
SAW CUTS
BRASS TUBE
13/16″
¾″
LATHE CHUCK
TAPERED SHAFT
ADJUSTING NUT
CYLINDER

Above—Size of cylinder. Transfer port is uncovered. Right—Good method to lap cylinder and piston. Use water soluble valve grinding compound, starting with coarse and finishing with fine grade until a mirror-like finish is obtained.

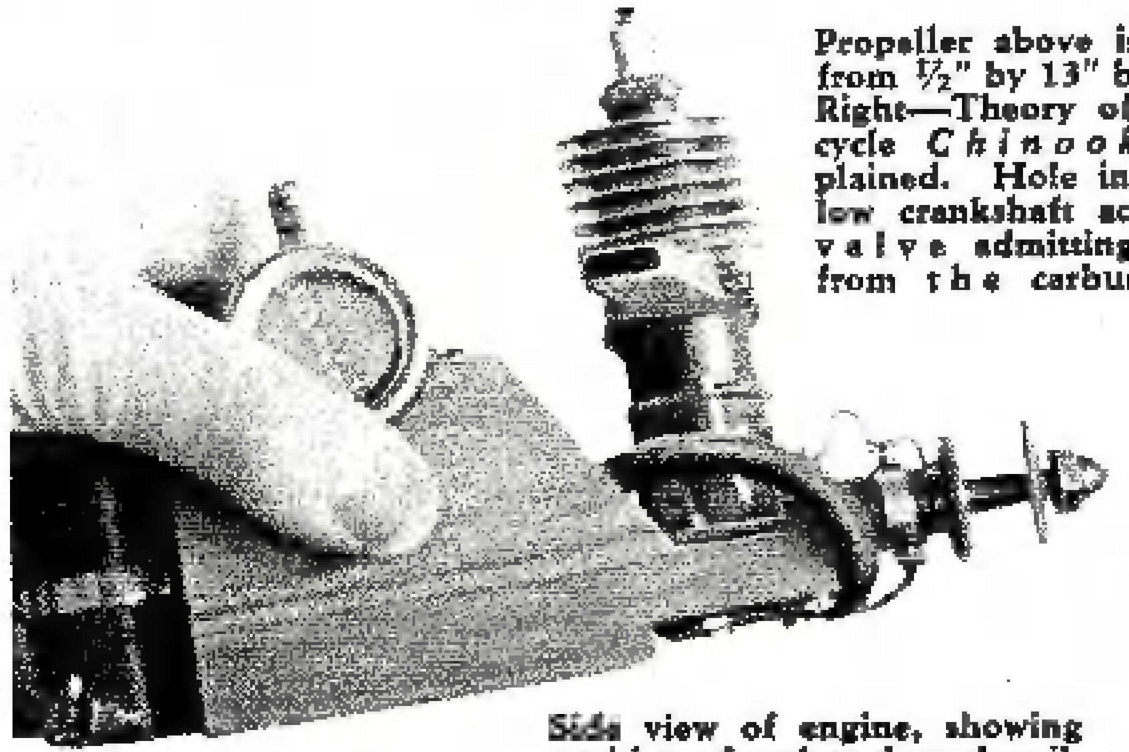

PROPELLER
TIMING CAM
ALUMINUM BACK COVER PLATE
CARBURETOR
SEAL WITH LIQUID GASKET MATERIAL
TO GROUND
TO SPARK PLUG
POSITIVE BATTERY LEAD
TO INSULATED COLLAR

Above—Seal all joints with gasket material when assembling. Note timing cam which permits spring to drop completing spark contact. Clamp is insulated from crankshaft housing. Right—Wiring of the model gasoline engine. Battery and coil ground leads should be securely connected to engine.

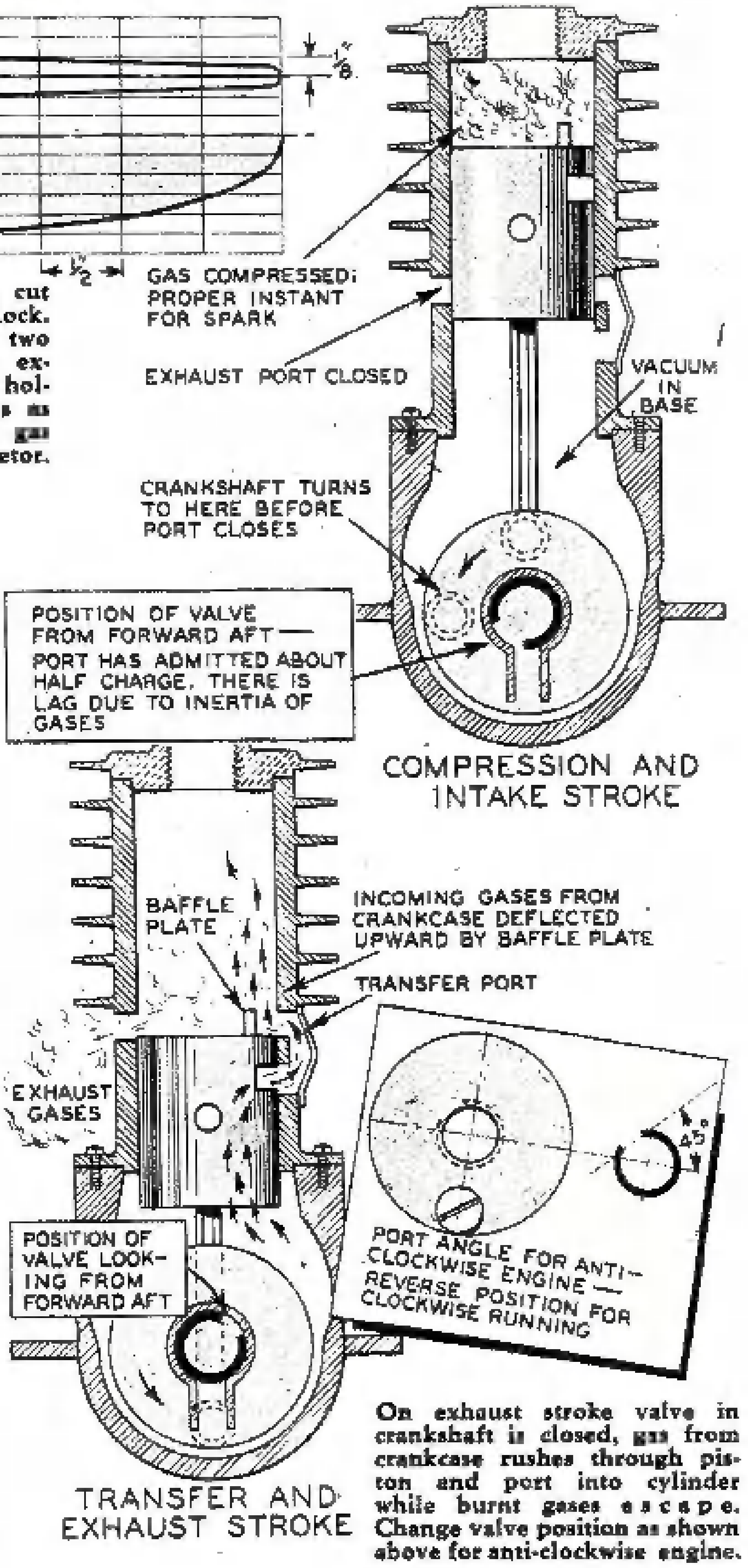
Operating Principle of Model Engine Is Simple



Propeller above is cut from ½″ by 13″ block. Right—Theory of two cycle *Chinook* explained. Hole in hollow crankshaft acts as valve admitting gas from the carburetor.



Side view of engine, showing position of tank and spark coil. Timing points are open. This is an indication that piston is on the exhaust stroke of cycle.


GAS COMPRESSED: PROPER INSTANT FOR SPARK
EXHAUST PORT CLOSED
VACUUM IN BASE
CRANKSHAFT TURNS TO HERE BEFORE PORT CLOSES
POSITION OF VALVE FROM FORWARD AFT— PORT HAS ADMITTED ABOUT HALF CHARGE. THERE IS LAG DUE TO INERTIA OF GASES
COMPRESSION AND INTAKE STROKE
BAFFLE PLATE
INCOMING GASES FROM CRANKCASE DEFLECTED UPWARD BY BAFFLE PLATE
TRANSFER PORT
EXHAUST GASES
POSITION OF VALVE LOOKING FROM FORWARD AFT
PORT ANGLE FOR ANTI-CLOCKWISE ENGINE — REVERSE POSITION FOR CLOCKWISE RUNNING
45°
TRANSFER AND EXHAUST STROKE

On exhaust stroke valve in crankshaft is closed, gas from crankcase rushes through piston and port into cylinder while burnt gases escape. Change valve position as shown above for anti-clockwise engine.

bronze bushing. This bushing is reamed out to take the 5/16″ crankshaft. Remove the case from the chuck, square the cylinder land face, smooth it off, and drill the hold down bolt holes, as well as the tap holes for the 2/56 filister head machine screws that hold on the 1/16″ aluminum back plate. This back plate is held sealed by the use of liquid gasket material obtainable at auto supply stores. Drill out the carburetor intake hole with a 3/16″ drill, shove the reamer through the bearing hole to clean off the burr, and the bearing and crankcase are prepared save for the carburetor.

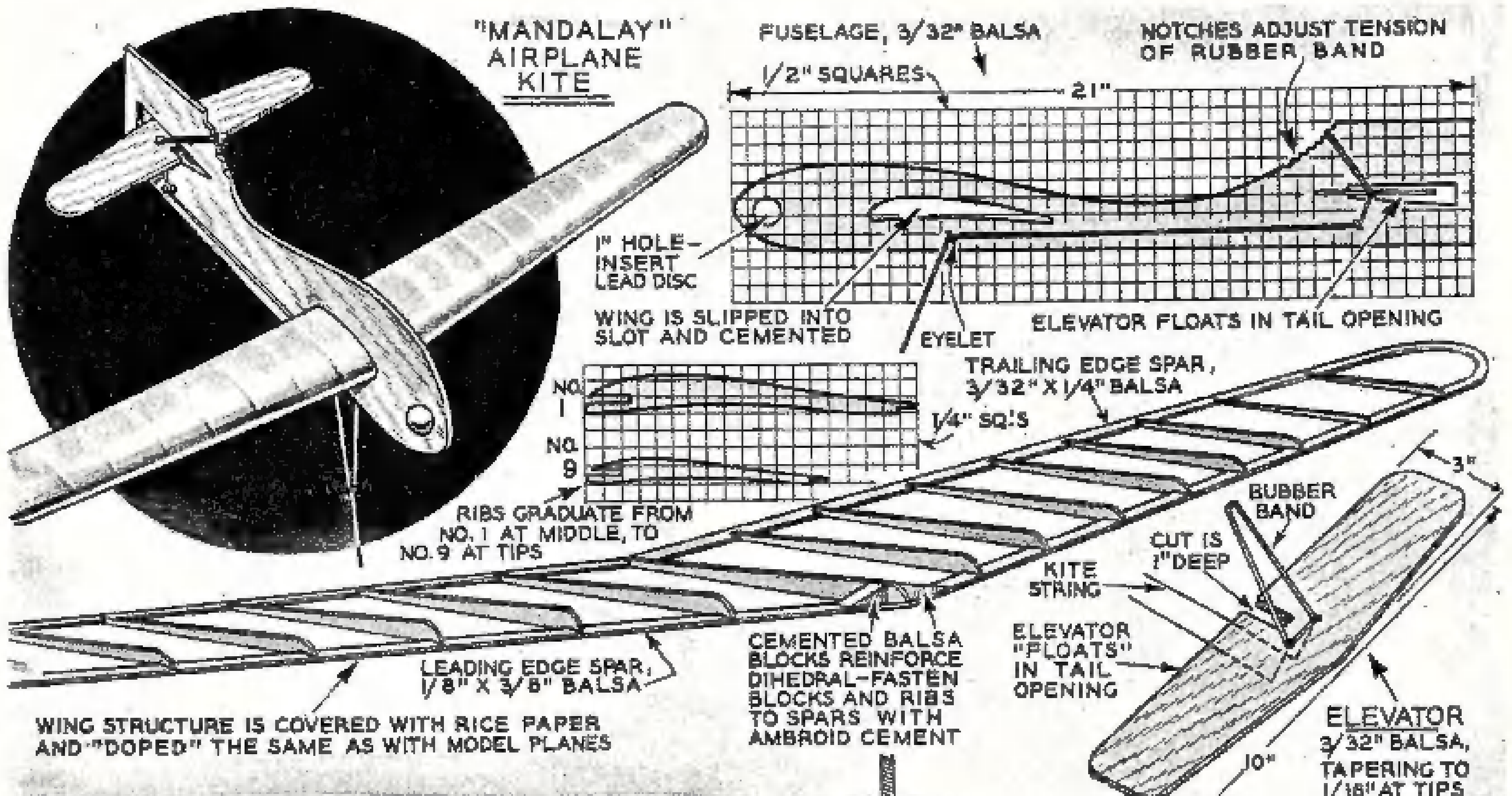
The carburetor is simplicity itself. It is merely a mixing valve, placed low in the engine to feed into the rotary valve, which prevents the engine from "Two Cycling", or reversing. Through the sleeve of the intake pipe run a ⅛″ drill. Tap one side. On this, the right side facing the engine, insert a small brass sleeve 5/16″ dia. into which a 1/16″ rod has been tapped with a 72 thread. This rod constitutes the needle valve, and must be pointed on one end.

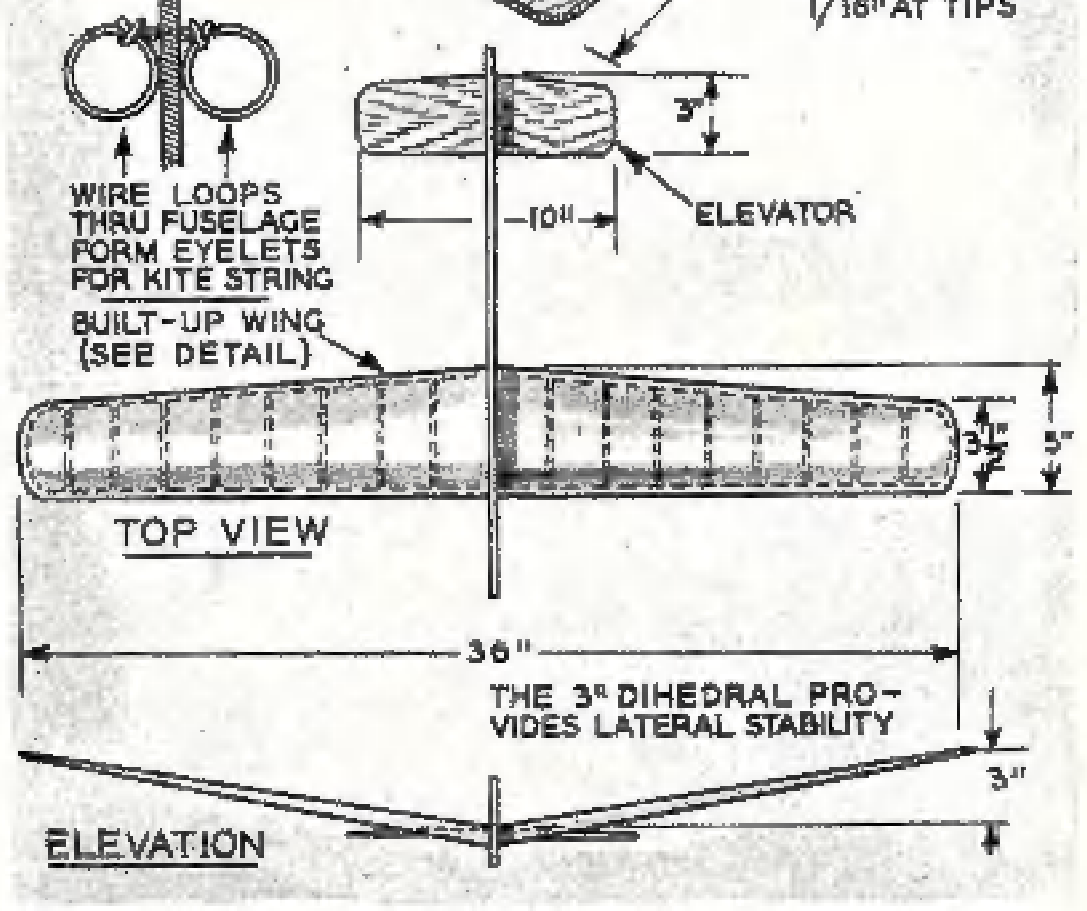
In the opposite side of the intake, a short ½″ length of steel with a needle hole, drilled in with a jewelers drill, is sweated. To this tube is doped a small rubber hose running to the toothpowder can which has been re-soldered to make a gasoline tank. The needle of the valve inpinges against the needle hole, and regulates the film of gasoline flowing into the intake. On the shank of the needle valve a small serrated collar is soldered. From the 3/16″ retaining tube a piece of stiff wire is run to bear on this collar to prevent vibration from disturbing the mixture.

This engine has fixed timing in the interests of simplicity. The brass spring running from the little knob on the bearing, bears against a cam cut into the steel propeller collar. This cam is made by filing a flat spot 1/16″ in depth with a ¼″ face, placed opposite the opening in the hollow crankshaft. This c.r.s. collar is 13/16″ diameter, and the face of the cam is ⅛″ wide. The collar is secured to the crankshaft by a drive fit, touched with a bead of solder to sweat the two together. A touch of a soldering iron will loosen the collar and it may be reset to suit your idea of correct timing, but in practice it has been found best, with an engine made from the plans shown here, to set it opposite the intake port on the crankshaft.

The wiring for the timer is orthodox. One wire is grounded from the coil. The other wire leads from the coil to the insulated collar which is clamped around the bearing boss. Two platinum points off an old model T coil furnish contact, and when the cam rolls around the circuit is made. When the circuit is broken, the coil sends a hot spark to the plug. The spark plug is a midget. The secondary wire from the coil of course leads to the spark plug. Across the contact points a small wireless condenser is bridged to reduce the sparking at the points. One wire of the battery goes to the post in the coil, the other

CAPTIVE Model PLANES Become FLYING KITES


"MANDALAY" AIRPLANE KITE
FUSELAGE, 3/32" BALSA
1/2" SQUARES
21"
NOTCHES ADJUST TENSION OF RUBBER BAND
1" HOLE—INSERT LEAD DISC
WING IS SLIPPED INTO SLOT AND CEMENTED
EYELET
ELEVATOR FLOATS IN TAIL OPENING
TRAILING EDGE SPAR, 3/32" X 1/4" BALSA
NO. 1
NO. 9
1/4" SQ'S
RIBS GRADUATE FROM NO. 1 AT MIDDLE, TO NO. 9 AT TIPS
3"
RUBBER BAND
CUT IS 1" DEEP
KITE STRING
LEADING EDGE SPAR, 1/8" X 3/8" BALSA
CEMENTED BALSA BLOCKS REINFORCE DIHEDRAL—FASTEN BLOCKS AND RIBS TO SPARS WITH AMBROID CEMENT
ELEVATOR "FLOATS" IN TAIL OPENING
ELEVATOR 3/32" BALSA, TAPERING TO 1/16" AT TIPS
10"
WING STRUCTURE IS COVERED WITH RICE PAPER AND "DOPED" THE SAME AS WITH MODEL PLANES


WIRE LOOPS THRU FUSELAGE FORM EYELETS FOR KITE STRING
3"
10"
ELEVATOR
BUILT-UP WING (SEE DETAIL)
3"
5"
TOP VIEW
36"
THE 3" DIHEDRAL PROVIDES LATERAL STABILITY
3"
ELEVATION

Both Mandalay and Sky Arrow kites are constructed according to the plans shown above except for slight physical changes. All planes use the same type of rubber band elevator control.

by DICK COLE

DOWN through the ages the common kite has played a very important part in the advancement of science. The early Chinese used kites in the construction of bridges, Franklin used the kite in his electrical experiments, and the kite was used, too, by the Wright brothers in their early aviation experiments at Kitty Hawk.

Although kite flying has been one of the chief pastimes of youth throughout the world it takes on new form with kites being fashioned after modern aircraft. The kite plane opens new fields to the model plane enthusiast who can now build ships that will soar for hours instead of merely jumping off the ground for a few seconds.

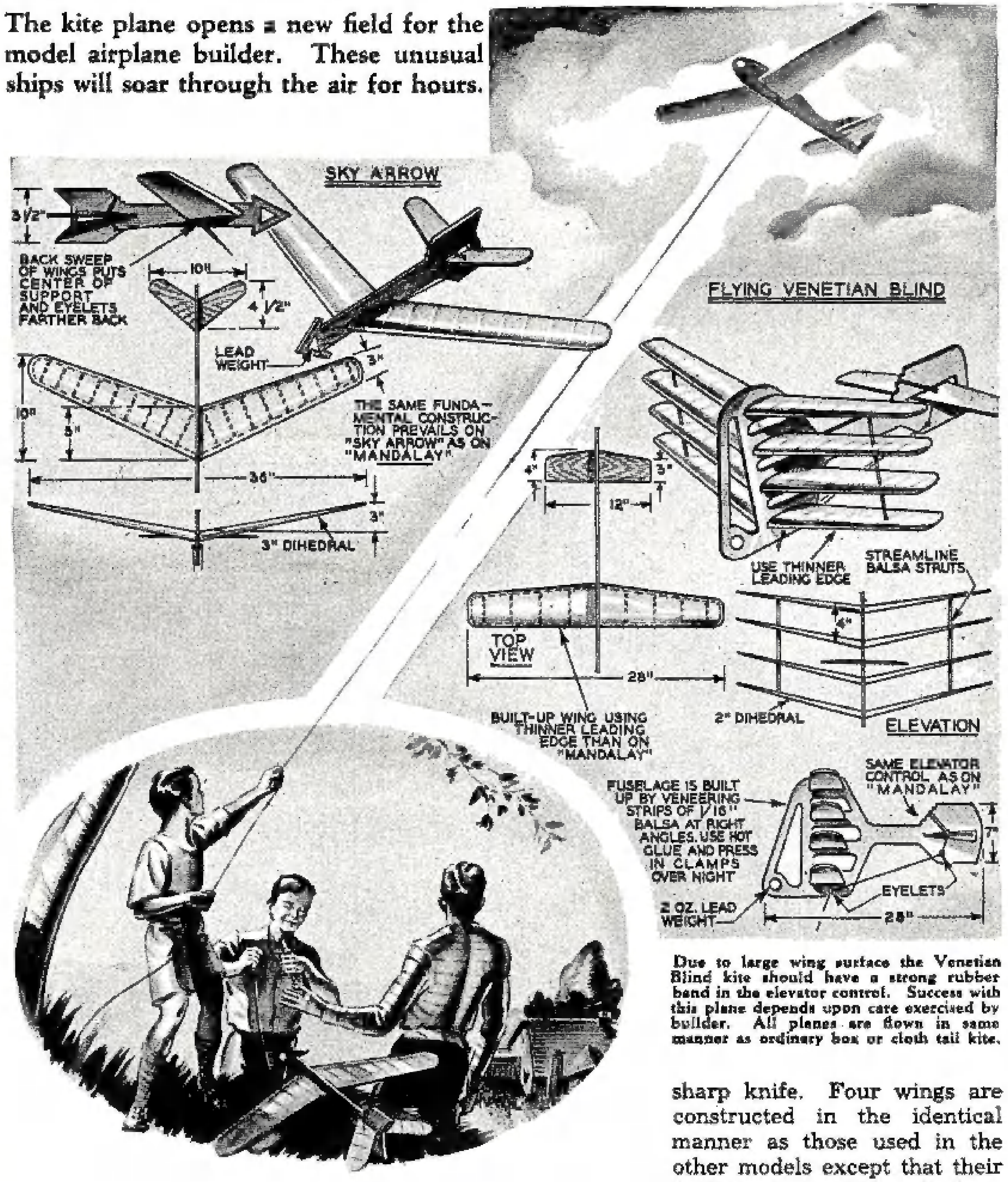
The simplest of airplane kites is the "Mandalay" which conforms closely to an ordinary model glider, except that the dihedral angle is somewhat greater. Then too the operator is able to control the rise and fall of the plane simple by pulling on the kite string. The string, which passes through an eyelet directly under the center support of the wing and then along the fuselage through another eyelet attached to the elevators, permits their adjustment while plane is in flight. All three types of planes illustrated are constructed along the same general lines. Cut the plane's fuselages from $\frac{3}{32}$" balsa wood and build up the wing in the same manner as in regular model plane construction. Cover the wing structure with Japanese tissue and then apply the dope so as to draw the wing covering tight.

Cut the elevators from $\frac{3}{32}$" balsa to the size and shape shown. The angle of the elevator is governed by a rubber band which is attached to the fuselage. Several sizes of rubber bands should be tried in order to secure the correct tension. A 1" hole cut in the nose of the plane holds a small piece of lead used to balance the plane when in flight.

In constructing the "Sky Arrow" the procedure is practically the same as for the "Mandalay". In this model, though, the back sweep of the wings requires that the eyelets for kite string be located farther back. The "Flying Venetian Blind" is somewhat different so far as fuselage construction is concerned. Here two sheets of $\frac{1}{16}$" balsa are veneered together then cut to shape with a sharp knife. Four wings are constructed in the identical manner as those used in the other models except that their leading edges are slightly thinner. The rubber band on elevator is also heavier than ones used on the other kites. The plane kites are flown in the same manner as the conventional tail or box kites.

Although a little more difficult to launch than the ordinary kites the planes are not at all difficult to keep in the air.

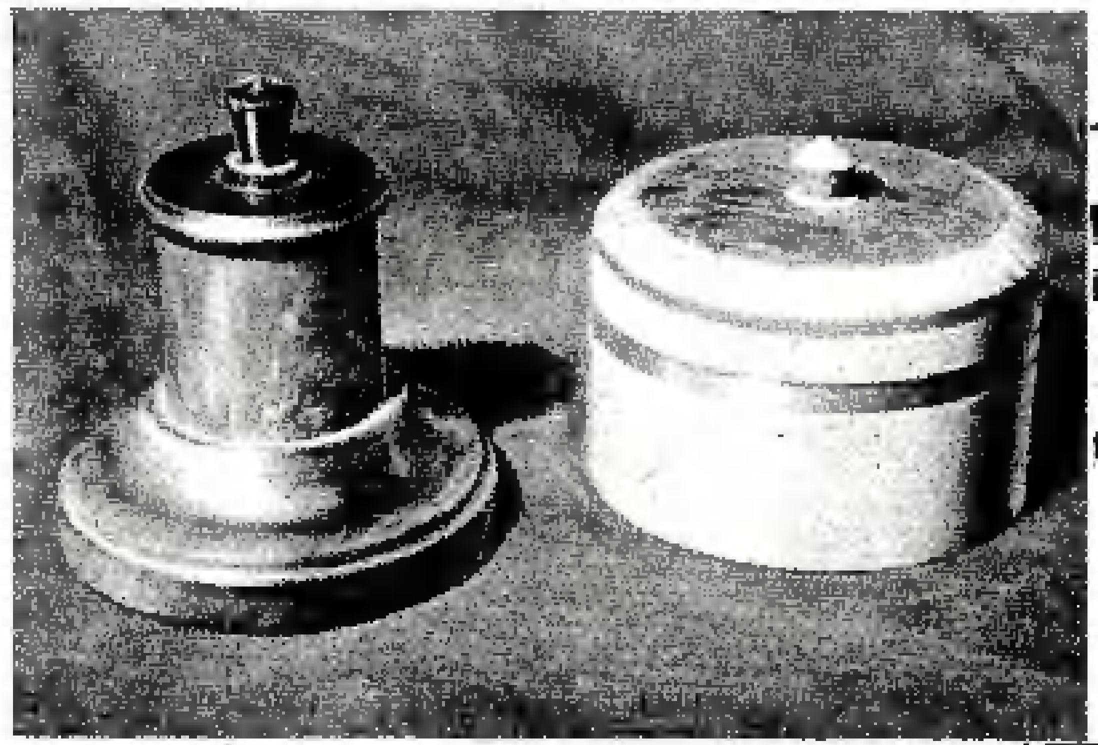
The kite plane opens a new field for the model airplane builder. These unusual ships will soar through the air for hours.


SKY ARROW
3 1/2"
BACK SWEEP OF WINGS PUTS CENTER OF SUPPORT AND EYELETS FARTHER BACK
10"
4 1/2"
LEAD WEIGHT
3"
10"
5"
THE SAME FUNDAMENTAL CONSTRUCTION PREVAILS ON "SKY ARROW" AS ON "MANDALAY"
36"
3"
3" DIHEDRAL
FLYING VENETIAN BLIND
4"
3"
12"
USE THINNER LEADING EDGE
STREAMLINE BALSA STRUTS
4"
TOP VIEW
28"
BUILT-UP WING USING THINNER LEADING EDGE THAN ON "MANDALAY"
2" DIHEDRAL
ELEVATION
SAME ELEVATOR CONTROL AS ON "MANDALAY"
FUSELAGE IS BUILT UP BY VENEERING STRIPS OF 1/16" BALSA AT RIGHT ANGLES. USE HOT GLUE AND PRESS IN CLAMPS OVER NIGHT
7"
EYELETS
2 OZ. LEAD WEIGHT
28"

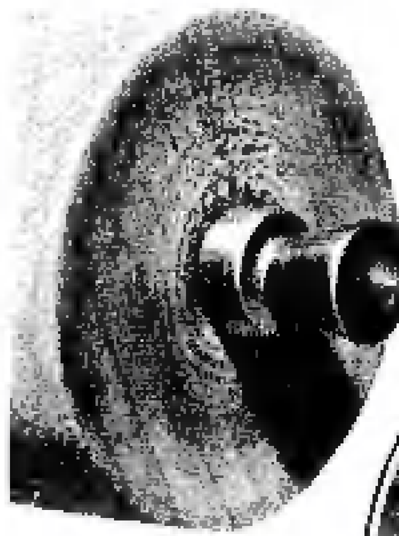
Due to large wing surface the Venetian Blind kite should have a strong rubber band in the elevator control. Success with this plane depends upon care exercised by builder. All planes are flown in same manner as ordinary box or cloth tail kite.

Make These NOVELTIES *with Rainbow-Hued* PLASTICS

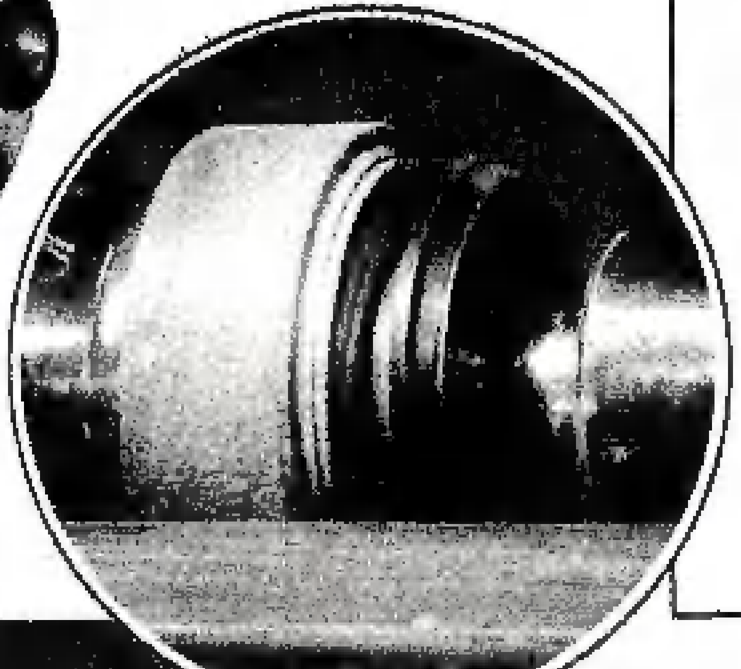
by **Dale R. VanHorn**



The attractive ink well and dresser box shown above were turned from colored plastics.

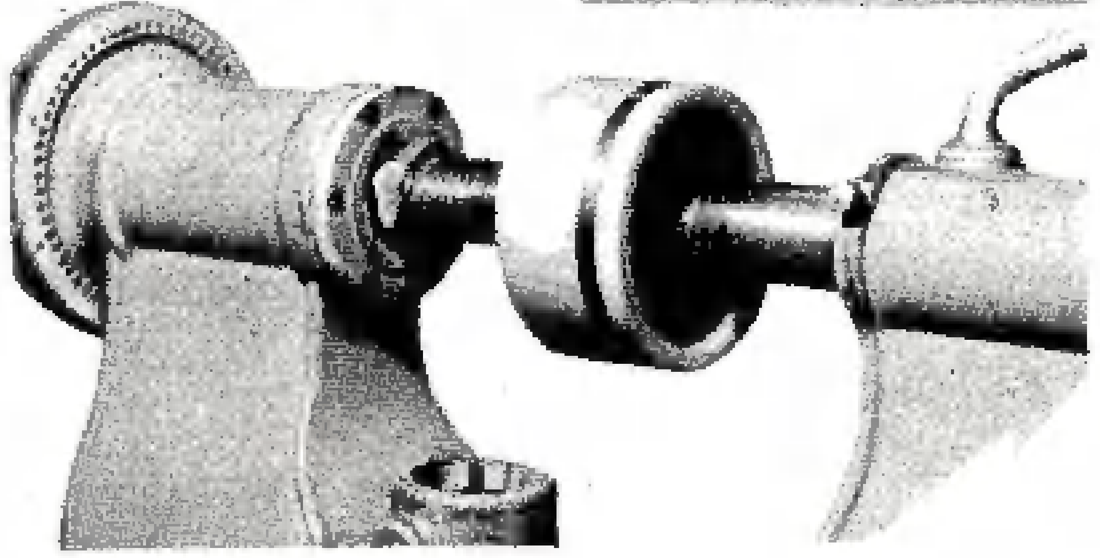


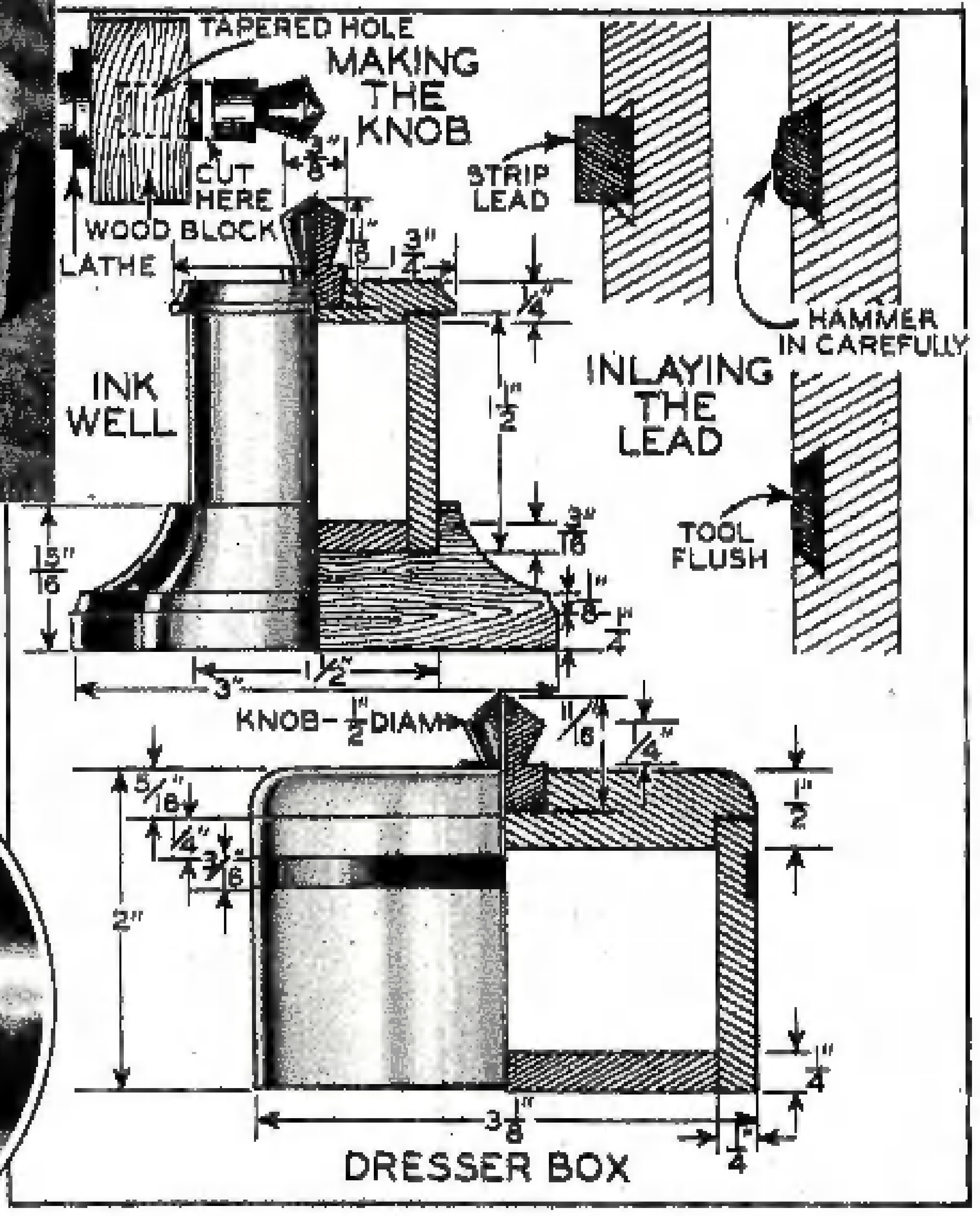
Form knobs by tapping short plastic rod into hole in block of wood and attach to the faceplate.



The base of the inkstand as it appears near its completion and below, looking into front of nearly completed inkstand.

Above—The walnut base of the ink stand mounted in the lathe. Below—the dresser box with the lead band inserted in the inlay groove.




TAPERED HOLE
MAKING THE KNOB
CUT HERE
WOOD BLOCK
LATHE
3/8"
1/16"
1 3/4"
1/4"
1 1/2"
3/16"
1/8"
1/4"
15/16"
1/2"
3"
INK WELL
STRIP LEAD
HAMMER IN CAREFULLY
INLAYING THE LEAD
TOOL FLUSH
KNOB–1/2" DIAM.
11/16
1/4"
5/16"
1/4"
3/16
2"
1/2"
1/4"
3 3/8"
1/4"
DRESSER BOX

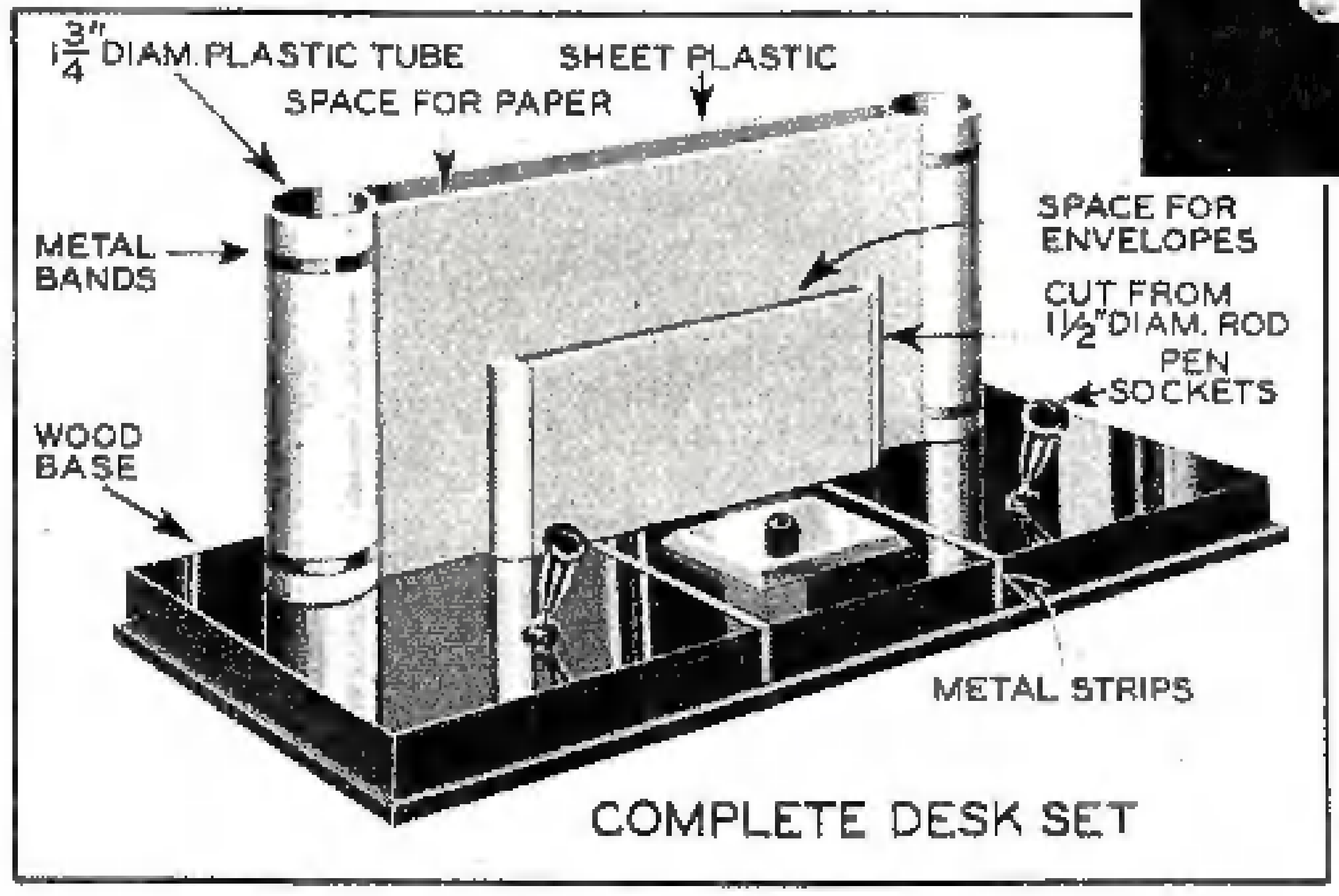
Dimensions for the inkstand and dresser box are all indicated in the above schematic drawing. Carefully note method used to keep lead inlay strips from becoming loose from turnings.

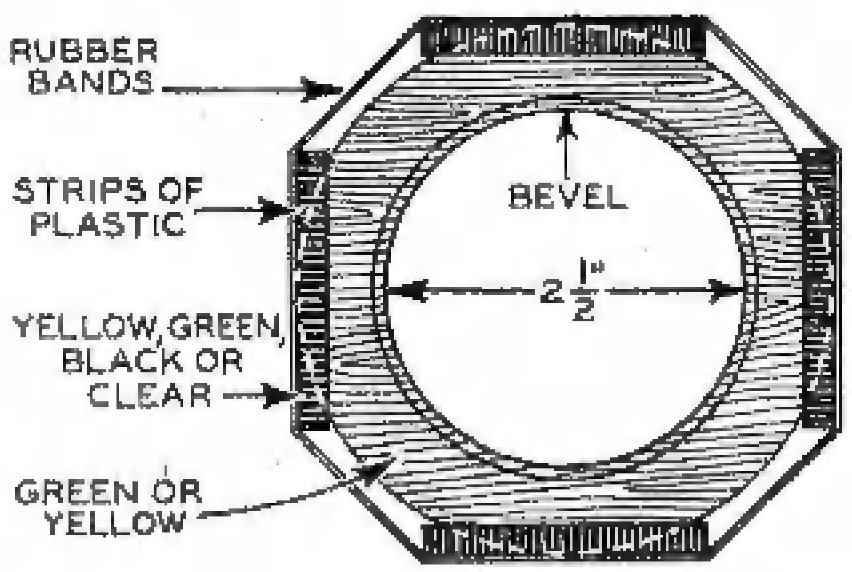
THE surprising adaptability of the new plastic materials and the striking results of the finished articles, makes them ideal for the home craftsman's turned projects.

Hard rubber, the first plastic, was confined to one color. Bakelite, the next important plastic discovery, was hard and it did not lend itself readily to easy manipulation in the home shop, but this new plastic can be worked like wood or soft metals, turned in the lathe, bent to shape in hot water, planed, drilled, filed or sanded, and takes a beautiful polish. Besides, every color of the rainbow are available.

To get acquainted with it, simple projects naturally come first. A solid color bracelet requires only the obtaining of a short length of 2½-inch tube of the right color. Turn a wood spindle with a slight taper so that the plastic cube can be forced to a snug fit upon it. Then with the proper chisels, round the inner edges, round the outside surface to the desired design, and polish. A variation consists of sanding four flat sides, evenly spaced and cementing strips of a contrasting color to these flat areas, using rubber bands to hold them in place until the cement has dried after which the ring is turned down on the lathe. Suggested color combinations are: yellow ring with green or black segments, green ring with yellow or black segments, black ring with yellow or orange segments.

Brilliant in color and as easy to work as wood, this new celluloid-like plastic material can be turned, cut or bent into attractive novelties. The projects described here are just a few of the many possible.


1 3/4" DIAM. PLASTIC TUBE
SHEET PLASTIC
SPACE FOR PAPER
METAL BANDS
WOOD BASE
SPACE FOR ENVELOPES
CUT FROM 1½" DIAM. ROD
PEN SOCKETS
METAL STRIPS
COMPLETE DESK SET


RUBBER BANDS
STRIPS OF PLASTIC
YELLOW, GREEN, BLACK OR CLEAR
GREEN OR YELLOW
BEVEL
2 1/2"

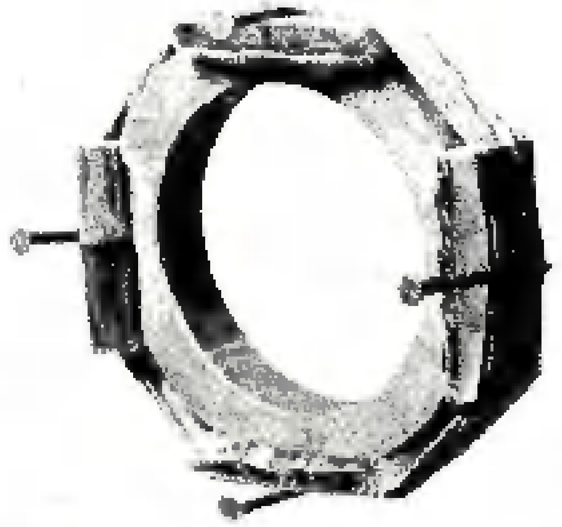
The desk set at left is not only attractive, but very easy to make. Simplest of all projects is the bracelet at right. Several layers of plastics provide designs that are as original as they are attractive in appearance.

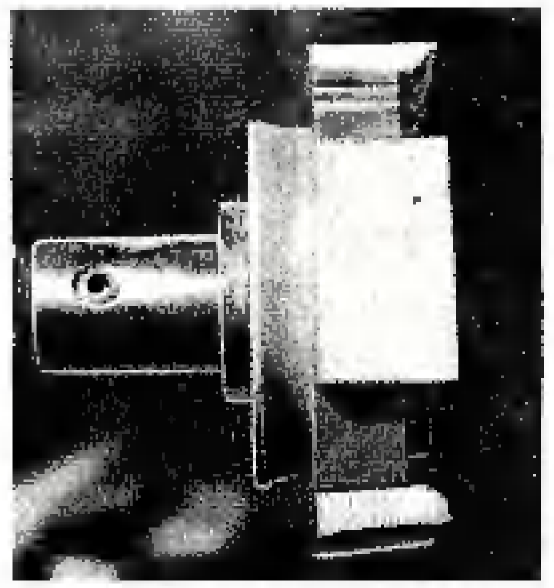
An attractive ink well which harmonizes almost anywhere can be made with a small block of walnut, a tube and a small piece of flat plastic. Turn the base to 3 inches in diameter of the design shown and sand, fill and finish with clear lacquer or shellac. Turn the center depression just large enough to take the plastic tube, to a depth of about $\frac{5}{16}$-inch. Felt should be glued to the base and the edges trimmed.

Turn a wood spindle to make a tapered fit for the plastic tube, work it on to a tight fit, and true up the ends, with a length of 1½ inches. The outside can be also trued with a chisel, then the polishing wax applied with a rag to give a lustre.

The bottom can be any thin flat plastic. It is turned between two blocks of wood in the lathe whose diameters are that of the inside diameter of the tube. One block is centered with the tail stock, the other with the live center. To prevent the flat piece from working out of alignment, drive two short brads in the exact centers of the adjoining ends of the spindle and file them to sharp, short points. The flat piece is then placed between them and the dead center worked up snug

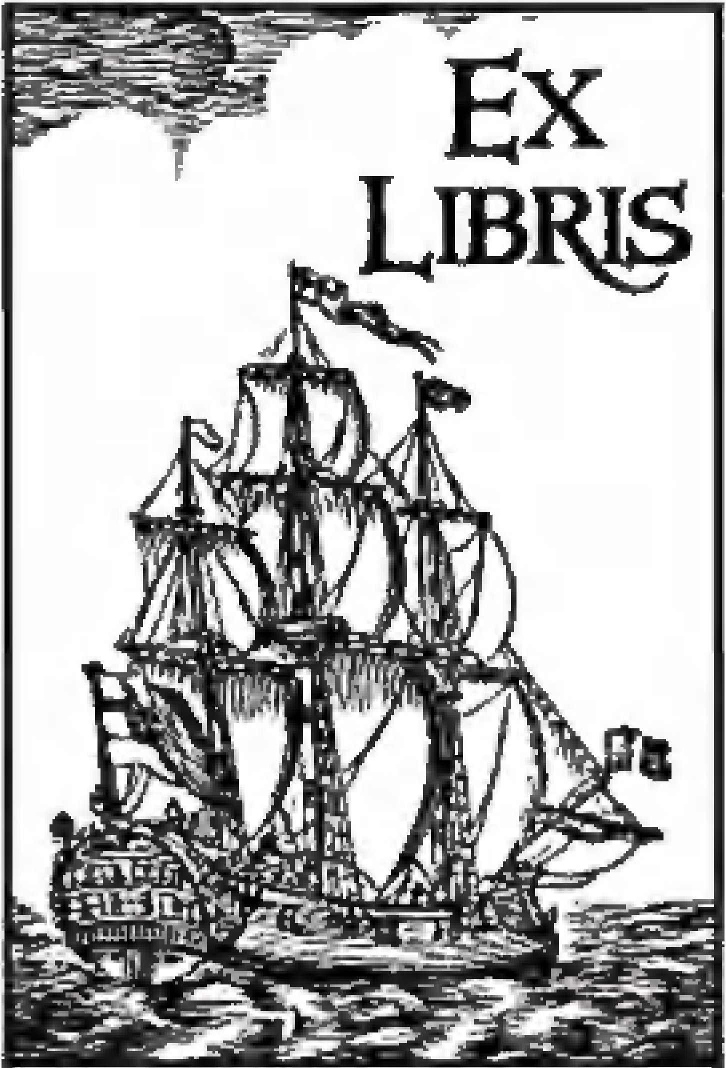
[*Continued on page* 122]





Nails driven into a block of wood attached to the lathe's faceplate will permit turning.

THE FINISHED BRACELET



Anon. Malefactor